A Reproduced Copy

OF

(NASA-TM-88621) AGRICULTURAL SPECTRAL SIGNATURES, YUMA TEST SITE, MISSION 91-21, MAY 7-9, 1974 (NASA) 154 p

N86-71239

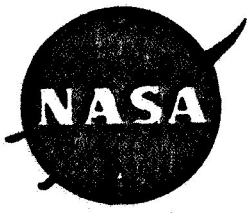
Unclas
00/43 00602

Reproduced for NASA

by the

NASA Scientific and Technical Information Facility

FFNo 672 Aug 65



COPY NO. 2

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

EARTH RESOURCES LABORATORY

@

MTF

AGRICULTURAL SPECTRAL SIGNATURES

YUMA TEST SITE

MISSION 91-21

MAY 7-9, 1974

DR. R.H. GRIFFIN, II

REPORT NO. 140

28 MAY 1974

LYNDON B. JOHNSON SPACE CENTER

INTRODUCTION

Basic to agricultural remote sensing applications is the study of crop signatures in the field at various growth stages and under various growing conditions.

A crop signature study is being conducted by the Earth Resources Laboratory at the University of Arizona Agricultural Experiment Station, Yuma, Arizona.

The purpose of the study is to determine areas of the spectrum and crop growth stages that would allow for the greatest probability of identification of each specific crop.

A layout of the Experiment Station is presented in Figure 1. The present study is being conducted in fields C-4 through C-14, identified in the figure as the "Signature Study" and the "Alkaloid Field Study".

The detailed plot plan for the spectral signature study is given in Figure 2. The numbers in the lower portion of each plot will be used throughout the study to reference the individual plots. Plots 7-11, 18-22, 24-33, and 40-44 were planted in February and March, 1974.

Figure 3 presents details of the alkaloid yield study area. Data points are indicated by the numbers 51-55 which will be used throughout the study to reference the individual plots. Due to the layout of the study, data cannot be obtained from treatment number 2.

Spectral data was taken with an Exotech model E20D filterwheel spectrometer mounted on a truck-boom 20 feet above the ground (Fig. 4 & 5). Three detectors were available: 1) Silicon (Si) with a wavelength range of 490-1290 nanometers was used at every field data point; 2) Lead Sulfide

(PbS) with a wavelength range of 900-1300 nanometers will be used at selected field data points; 3) Mercury-Cadmium-Telluride (HgCdTe) with a wavelength range of 4100-14400 nanometers will be used during the latter part of the study on selected field data points after calibration of the detector is completed.

A Hasselblad model 500 EL with 80mm lens was mounted on the truck boom (Fig. 5) parallel to the spectrometer in order to photograph the spectrometer target. The spectrometer footprint was drawn on each photograph and vegetation ground cover percentage determined.

Incoming radiation was measured with an Eppley Pyranometer and recorded for each day that spectrometer data was taken (Fig. 6). Air temperature and relative humidity were recorded at two and five feet above the ground. Table 1 contains data taken at 1 hour intervals from 7 am to 6 pm on the days when spectrometer measurements were made.

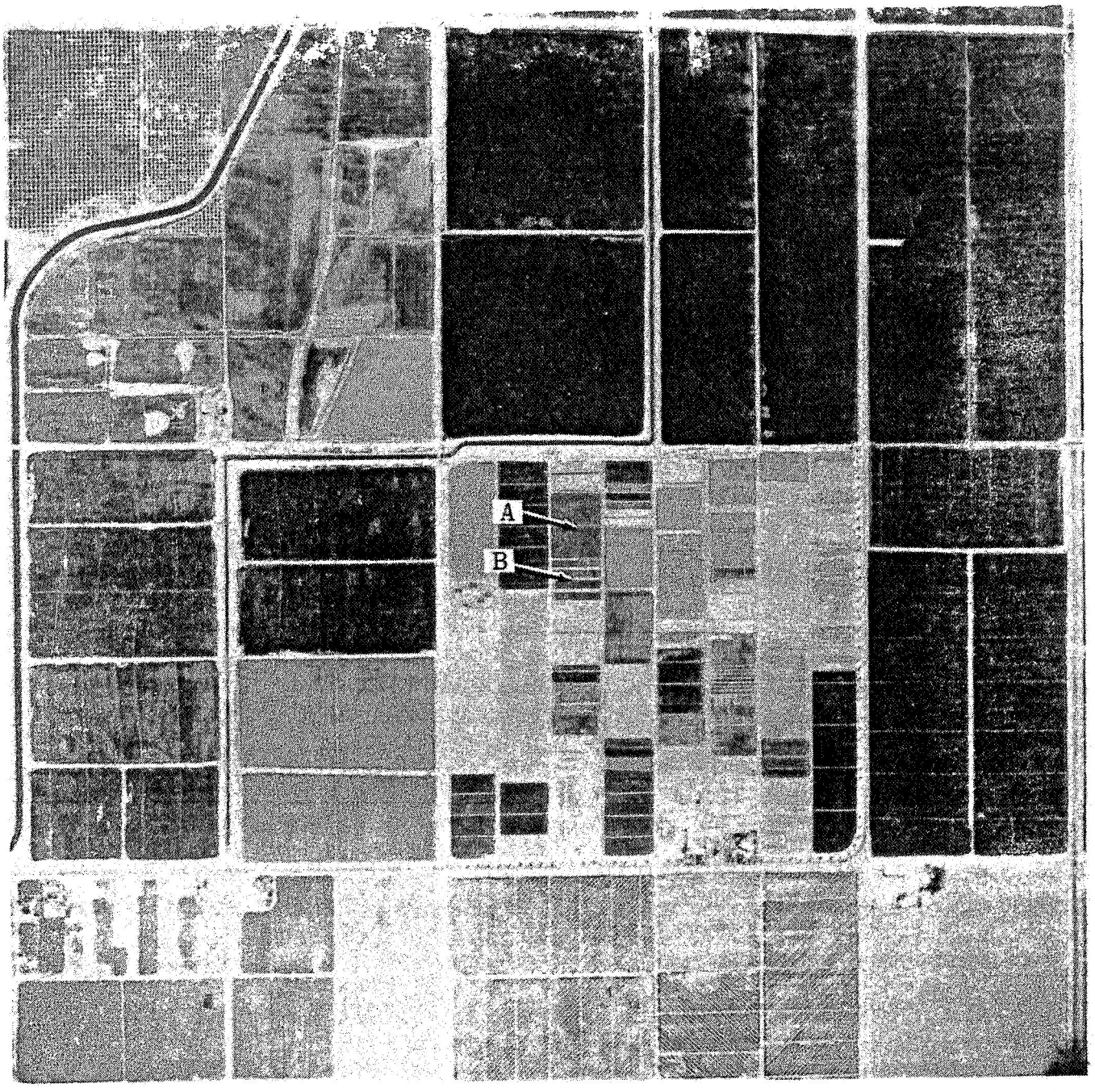
Ground level photographs were taken of each sampling point along with observations on height, growth stage, and general crop conditions.

Spectral signatures from the Si and PbS detectors were obtained by ratioing the target reflectance against the incoming radiation to give percentage reflectance. The HgCdTe detector data will be presented as apparent temperature.

This is one of a series of data reports; each will contain the data collected at the Yuma, Arizona test site since issuance of the previous report. A final analysis and summary will be issued after the study is completed.

Data was collected May 7 - 9, 1974 from the following targets: onions, poppy - 1, poppy - 3, bare ground, carrot, chick peas, poppy - 2, poppy - 4, potatoes, pinto beans, soybeans, zucchini squash, and banana squash.

Due to an equipment malfunction on May 8, data beyond 1.05 microns was not reliable and is not shown in the spectral plots.



UNIVERSITY OF ARIZONA AGRICULTURAL EXPERIMENT STATION, YUMA, ARIZONA

February 17, 1974, Altitude 5000 ft., K-17 Camera (6" focal length lens)

A- ALKALOID YIELD STUDY
B- SPECTRAL SIGNATURE STUDY

FIGURE 1A

FIELD NUMBERING SYSTEM

UNIVERSITY OF ARIZONA - YUMA VALLEY EXPERIMENT STATION

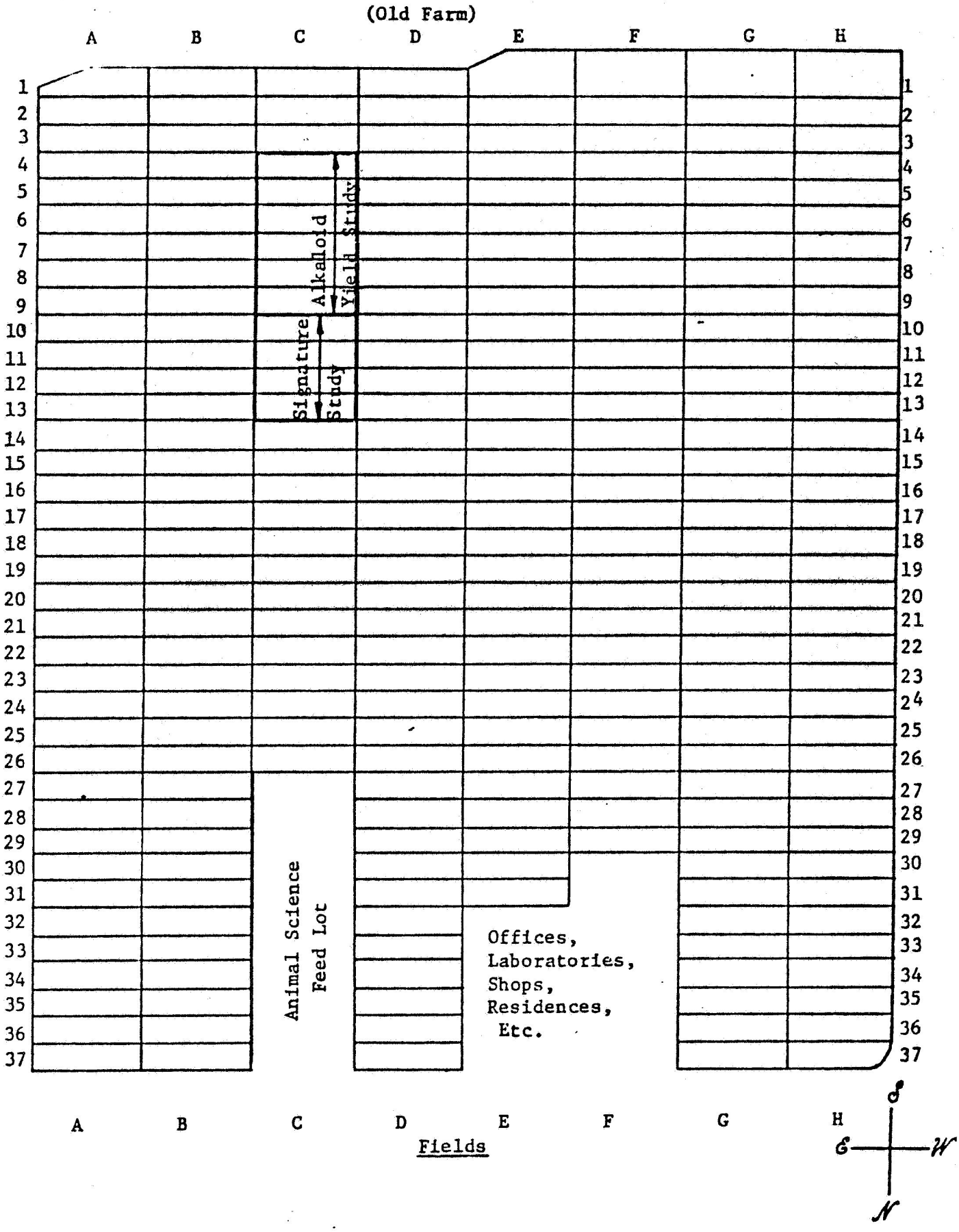


Figure 1 STATION PLAN

Spectral Signature Study
USDA, NASA, Lockheed and U of A Cooperating
Yuma, Ariz, 1973-74
Field C, Border 10-13

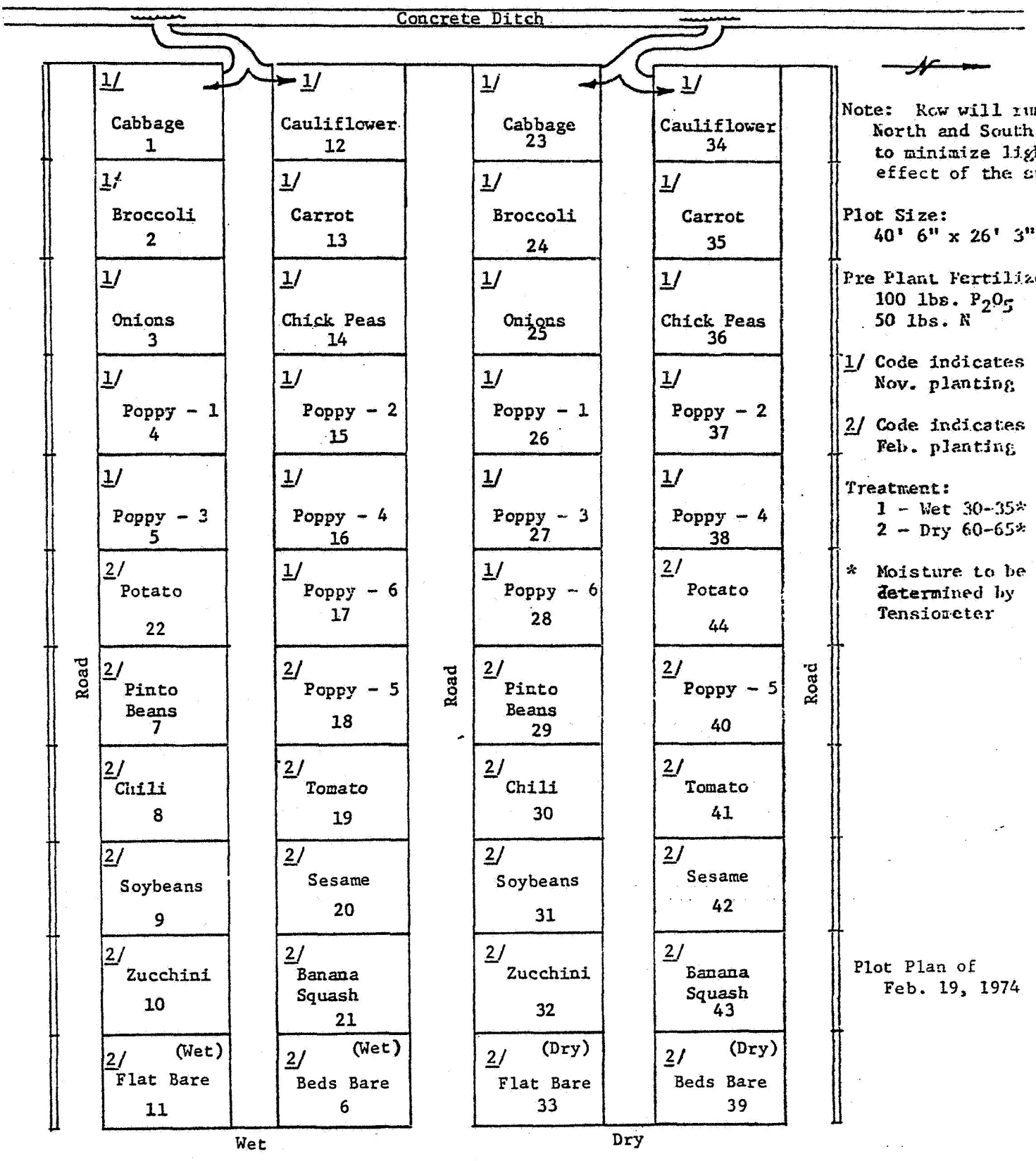
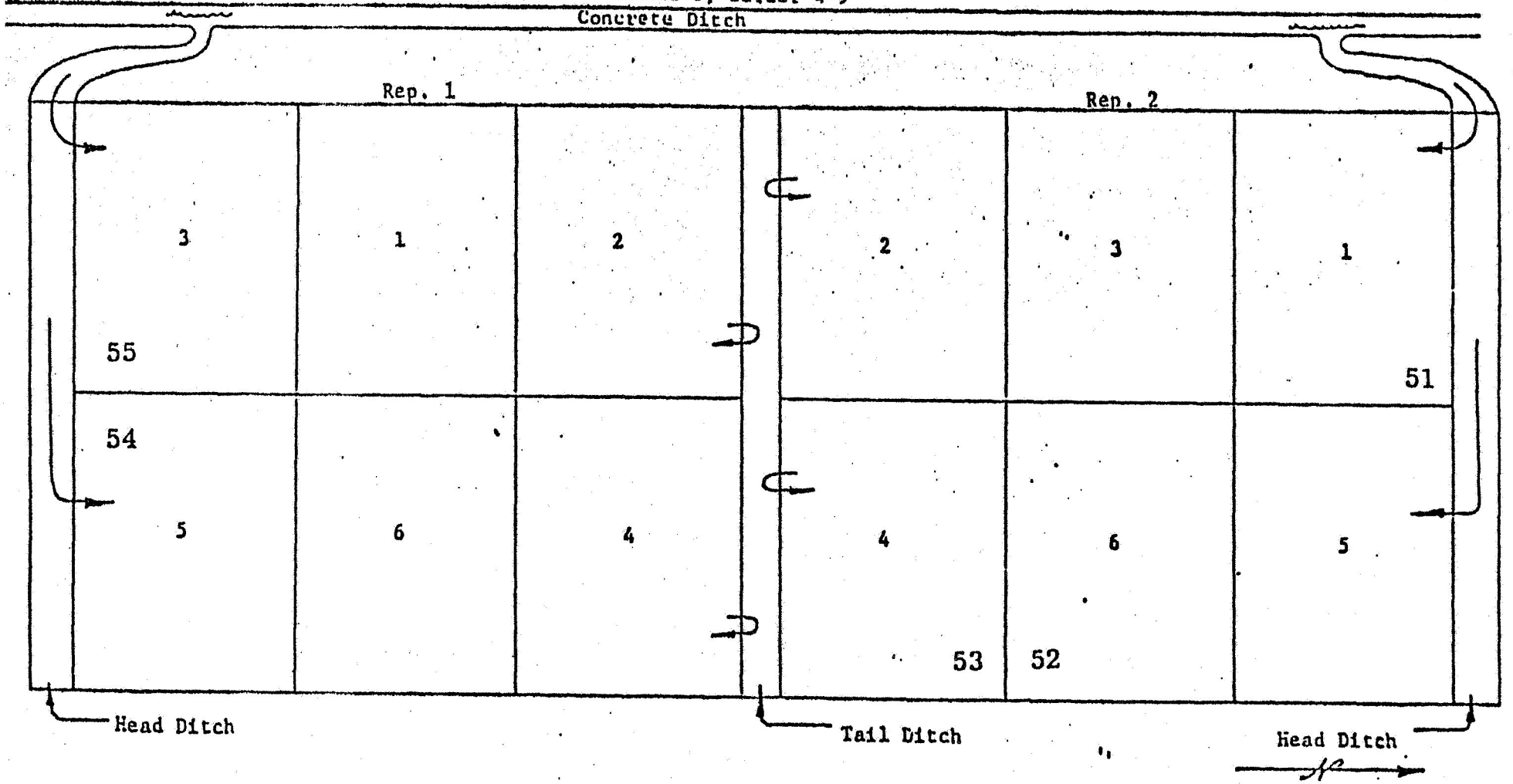


Figure 2 SIGNATURE STUDY PLAN

POPPY
Alkaloid Yield Study
USDA, U of A Cooperating
Field C, Border 4-9



DATA POINT	TREATMENT IDENTIFICATION	
51	1. Variety 1	6 cm spacing
	2. Variety 1	12 cm spacing
55	3. Variety 1	18 cm spacing
53	4. Variety 2	6 cm spacing
54	5. Variety 2	12 cm spacing
52	6. Variety 2	18 cm spacing

Note: Rows will run North and South to minimize light effect of the sun.
Plot Size: 140' x 60'
Pre Plant Fertilizer: 100 lbs P_2O_5 50 lbs N
Planting Date: November 7, 1973.
Germination Irrigation: November 8, 1973

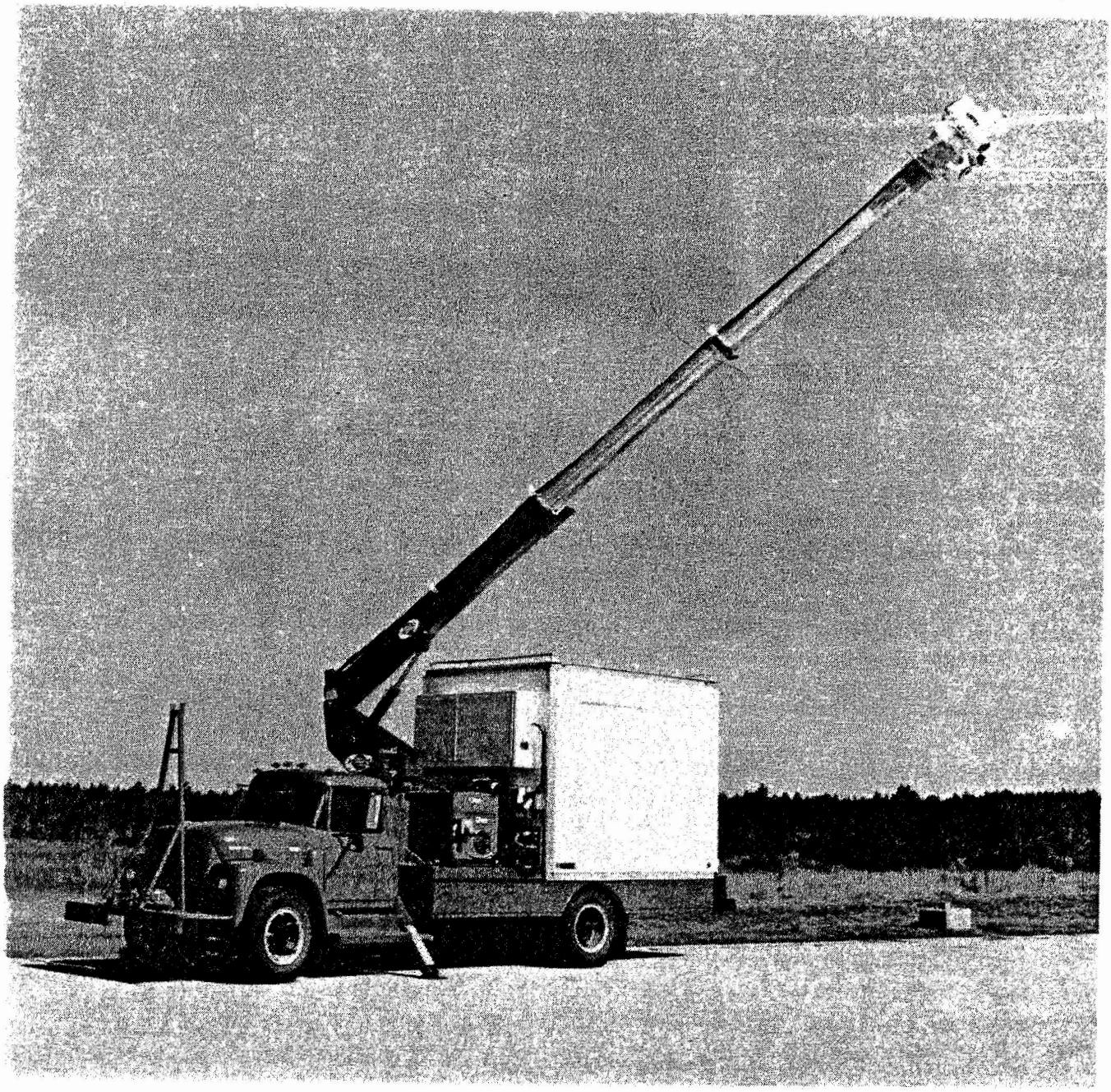


Figure 4 ERL REMOTE SENSING INSTRUMENTED VAN

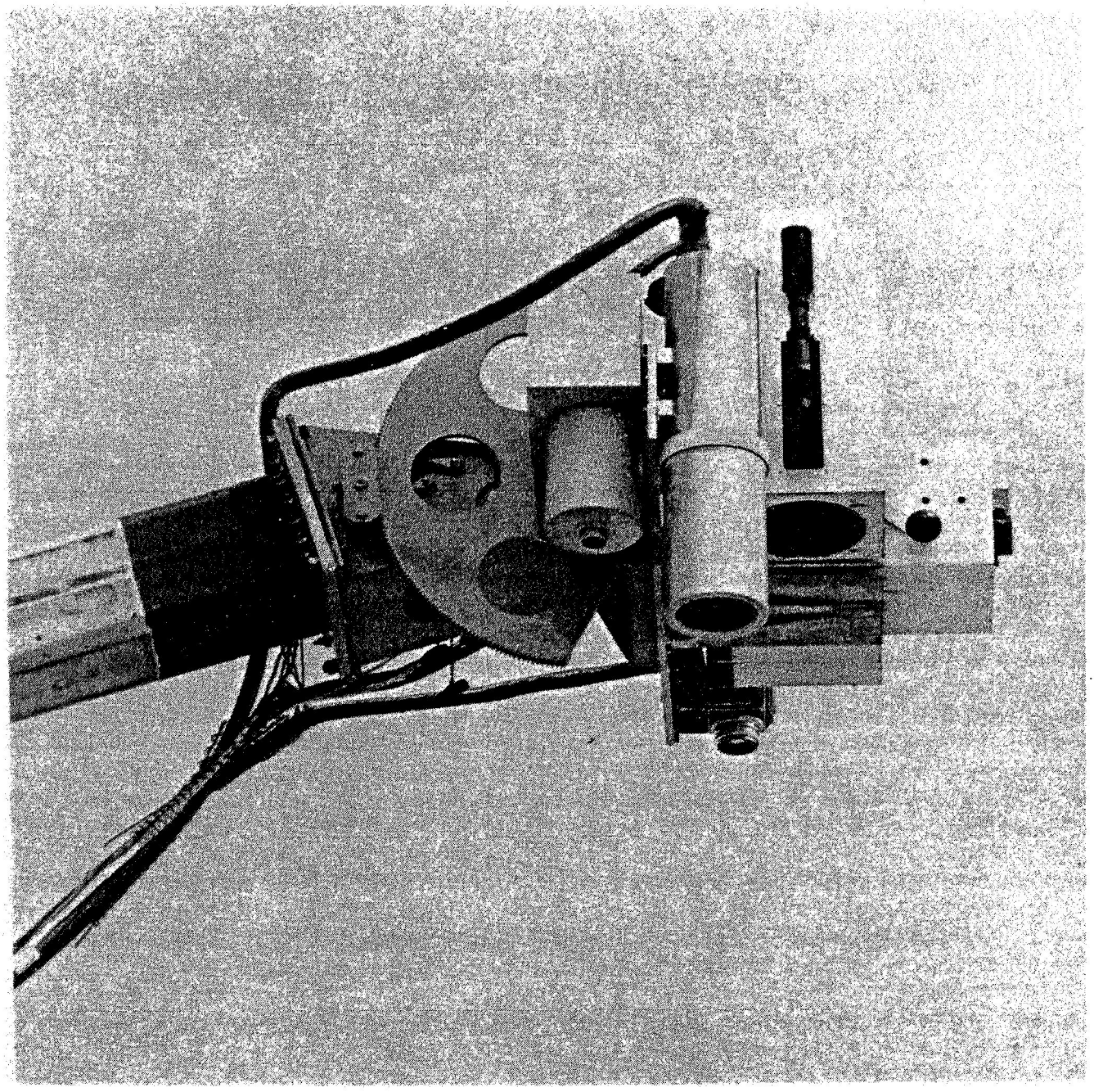
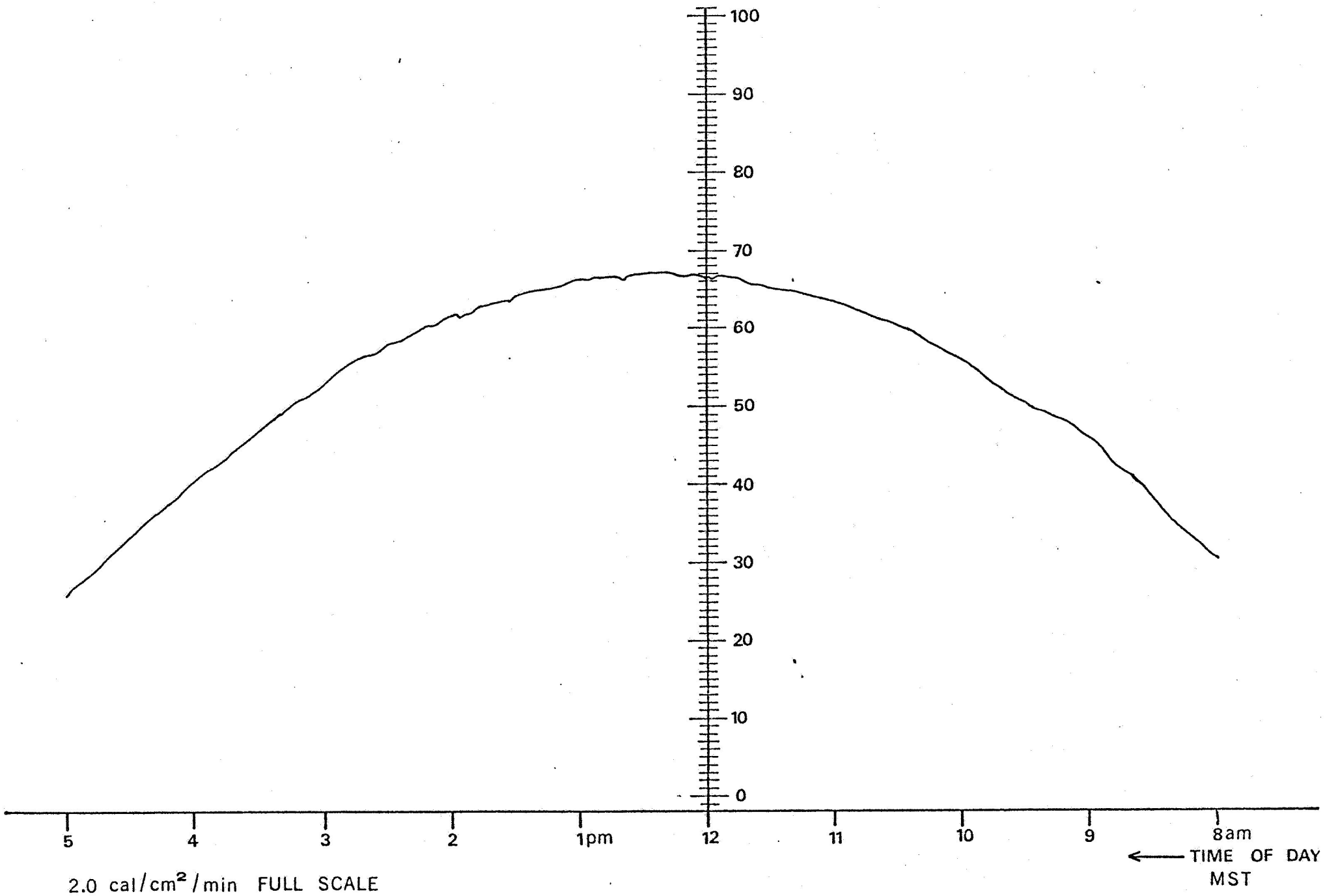
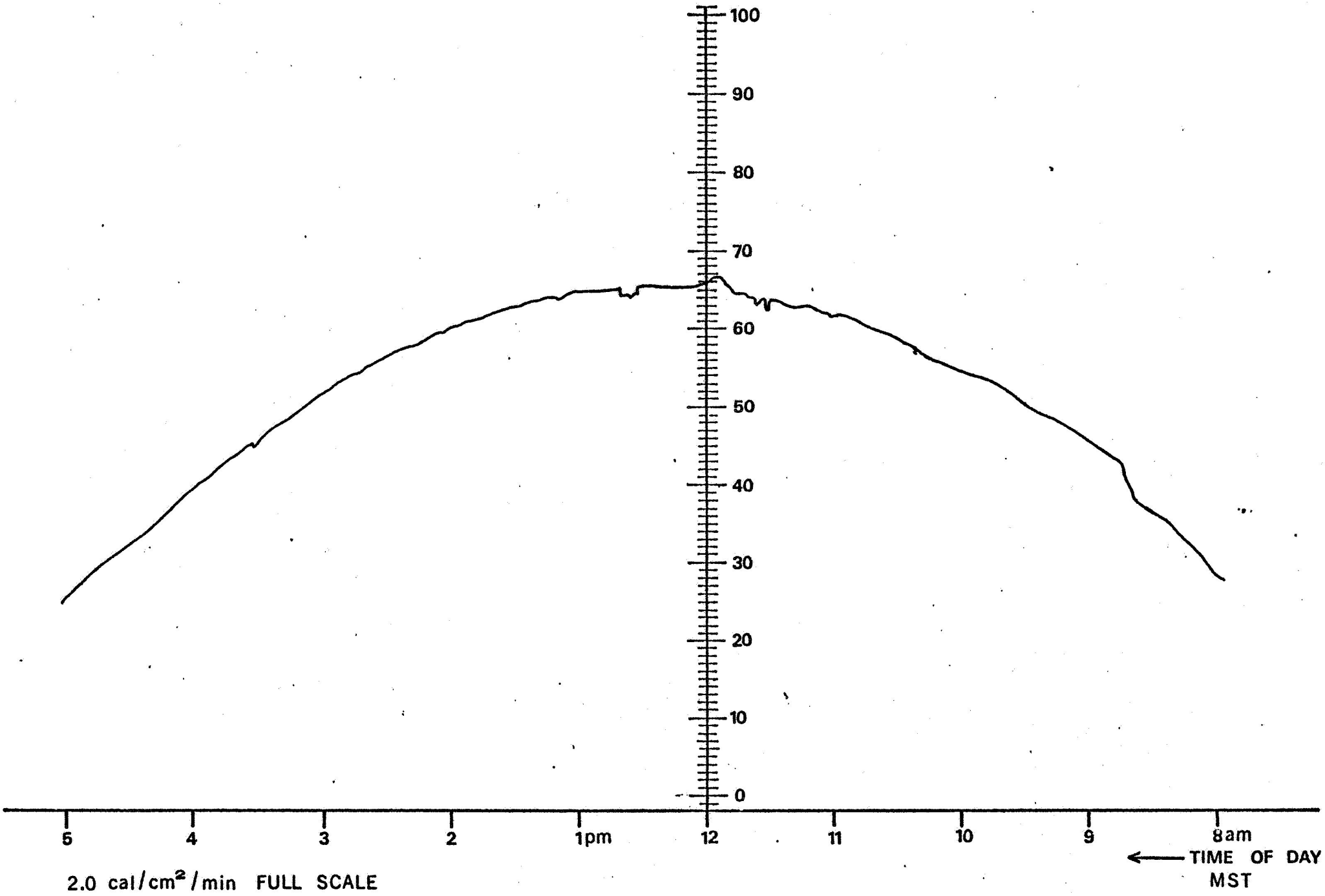


Figure 5 TRUCK BOOM MOUNTED SENSOR SYSTEM



MAY 8, 1974

PYRANOMETER CURVE



MAY 9, 1974

Figure 6 PYRANOMETER CURVE

Table 1 RELATIVE HUMIDITY and TEMPERATURE

MAY 8, 1974

TIME	2 FEET		5 FEET	
MST	R.H. %	TEMP. °F	R.H. %	TEMP. °F
7 am	98	58	NO DATA	NO DATA
8 am	68	65	NO DATA	NO DATA
9 am	50	75	NO DATA	NO DATA
10 am	41	80	NO DATA	NO DATA
11 am	31	84	NO DATA	NO DATA
12 am	32	86	NO DATA	NO DATA
1 pm	30	88	NO DATA	NO DATA
2 pm	30	90	NO DATA	NO DATA
3 pm	26	91	NO DATA	NO DATA
4 pm	28	90	NO DATA	NO DATA
5 pm	30	89	NO DATA	NO DATA
6 pm	34	83	NO DATA	NO DATA

Table 1 RELATIVE HUMIDITY and TEMPERATURE

MAY 9, 1974

TIME	2 FEET		5 FEET	
MST	R.H. %	TEMP.°F	R.H. %	TEMP.°F
7 am	98	56	NO DATA	NO DATA
8 am	70	64	NO DATA	NO DATA
9 am	52	75	NO DATA	NO DATA
10 am	52	76	NO DATA	NO DATA
11 am	42	81	NO DATA	NO DATA
12 am	36	86	NO DATA	NO DATA
1 pm	34	88	NO DATA	NO DATA
2 pm	34	91	NO DATA	NO DATA
3 pm	30	92	NO DATA	NO DATA
4 pm	32	93	NO DATA	NO DATA
5 pm	31	92	NO DATA	NO DATA
6 pm	34	88	NO DATA	NO DATA

PLOT DETAILS

THIS SECTION CONTAINS FOR EACH PLOT THE FOLLOWING DETAILS:

- CROP HISTORY
- GROUND LEVEL PHOTO
- BORESIGHT PHOTO
- GROUND TRUTH DATA
- SPECTROMETER CURVE

PLOT NO. 1 CABBAGE

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing
Nov 9, 1973	Irrigated
Nov 12, 1973	First emergence
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 12"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 4, 1974	Irrigated
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Feb 20, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 15, 1974	Irrigated
Mar 27, 1974	Irrigated
Apr 12, 1974	Hoed weeds, irrigated
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated

PLOT NO. 1 CABBAGE

GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 12, 1973	2	5	Moist	Normal	-
Dec 18, 1973	2.5	2	Dry	Thinning - shock slightly wilted	-
Jan 3, 1974	4	5	Moist 1.5"down	Cold-wilted	-
Jan 10, 1974	5	17	Moist .5" down	Normal	-
Jan 14, 1974	5	20	Wet	Normal	-
Jan 25, 1974	6	25	Moist 1" down	Normal	5% weeds, salt c rows - Jan 21, 1974
Jan 30, 1974	7	25	Moist 2" down	Normal	-
Feb 7, 1974	9	25	Wet	Normal	Irrigated Feb '4, No weeds
Feb 14, 1974	10	27	Moist 1" down	Normal	-
Feb 22, 1974	10	28	-	Normal	-
Feb 28, 1974	10	30	-	Normal	-
Mar 8, 1974	10	31	Moist	Normal	-
Mar 13, 1974	11	33	Moist	Normal	-
Mar 20, 1974	12	35	Moist	Normal	-
Mar 27, 1974	12.5	38	Moist	Normal	Beginning to bud
Apr 3, 1974	12.5	60	Moist	Normal	Heads 50% fille
Apr 11, 1974	12	70	Moist	Normal	Heads mostly fil base leaves yellowing on 50% of plants
Apr 18, 1974	12	70	Moist	Yellowing	Heads formed
Apr 27, 1974	5	60	Moist	Post-harvest	-

PLOT NO.2 BROCCOLI

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing
Nov 9, 1973	Irrigated
Nov 12, 1973	First emergence
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 12"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 4, 1974	Irrigated
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Feb 20, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 15, 1974	Irrigated
Mar 27, 1974	Irrigated
Apr 12, 1974	Hoed weeds, irrigated
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated

PLOT NO. 2 BROCCOLI

GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 12, 1973	2	5	Moist	Normal	-
Dec 18, 1974	2.5	2	Moist 1" down	Thinning shock slightly wilted	Thinned Dec 17, 1973
Jan 3, 1974	4	5	Moist 1.5"down	Cold-wilted	-
Jan 10, 1974	5	15	Moist .5" down	Normal	-
Jan 14, 1974	6	18	Wet	Normal	-
Jan 25, 1974	8	22	Moist 1" down	Normal	Tens. = 20, sal on row - Jan 21 1974
Jan 30, 1974	9	24	Moist 2" down	Normal	-
Feb 7, 1974	10	30	Wet	Normal	Irrigated Feb 4 no weeds - Tens. = 30
Feb 14, 1974	12	31	Moist 1" down	Normal	-
Feb 22, 1974	14	38	-	Normal	Tens. = 20 on F 15, 36 Feb 19, Feb 20
Feb 28, 1974	17	39	-	Normal	-
Mar 8, 1974	19	45	Moist	Normal	-
Mar 13, 1974	24	60	Moist	Normal	Tens. = 20 on F 28, 59 Mar 4, 7 Mar 6, 52 Mar 1 61 Mar 15
Mar 20, 1974	-	70	Moist	Normal	Beginning to he
Mar 27, 1974	25	100	Moist	Normal	Two plants with yellow blossoms, Tens. = 20 plus Mar 19 and Mar 2
Apr 3, 1974	29	100	Moist	Normal	25 plants with yellow blossoms
Apr 11, 1974	21	50	Moist	Harvested	Height and groun cover taken at data point

PLOT NO. 3

ONIONS

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 4 rows on 40" beds with 4-8-4" spacing
Nov 9, 1973	Irrigated
Nov 21, 1973	Irrigated
Nov 26, 1973	First emergence
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Hand weeded - Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 4, 1974	Irrigated
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Feb 20, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 15, 1974	Irrigated
Mar 27, 1974	Irrigated
Apr 12, 1974	Hoed weeds, irrigated
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated

PLOT NO. 3

ONIONS

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 4 rows on 40" beds with 4-8-4" spacing
Nov 9, 1973	Irrigated
Nov 21, 1973	Irrigated
Nov 26, 1973	First emergence
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Hand weeded - Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 4, 1974	Irrigated
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Feb 20, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 15, 1974	Irrigated
Mar 27, 1974	Irrigated
Apr 12, 1974	Hoed weeds, irrigated
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated

PLOT NO. 3 ONIONS

GROUND TRUTH DATA

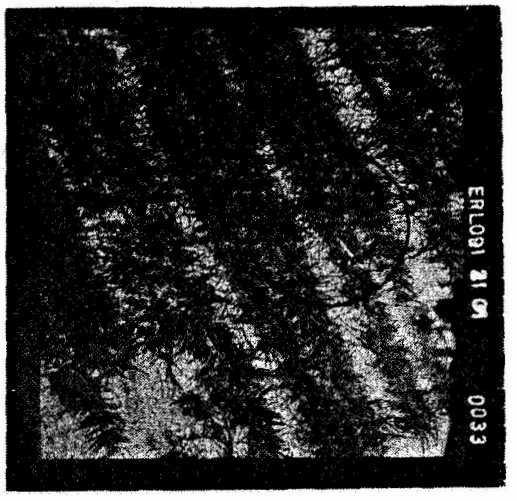
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 12, 1973	-	1	Moist	Normal	-
Dec 18, 1973	.5	1	Moist 1" down	Wilted	-
Jan 3, 1974	3.5	2	Moist 1.5" down	Cold-wilt	-
Jan 10, 1974	3	10	Moist .5" down	Normal	-
Jan 14, 1974	4	8	Wet	Normal	Weeded, thinned Jan 14, 1974
Jan 25, 1974	6	15	Moist 1" down	Normal	Salt on rows Jan 21, 1974
Jan 30, 1974	7	15	Moist 2" down	Normal	-
Feb 7, 1974	8	17	Wet	Normal	Irrigated Feb 4, no weeds
Feb 14, 1974	8	17	Moist 1" down	Normal	-
Feb 22, 1974	10	18	-	Normal	-
Feb 28, 1974	13	25	-	Normal	-
Mar 8, 1974	14	25	Moist	Normal	-
Mar 13, 1974	15	27	Moist	Normal	-
Mar 20, 1974	19	30	Moist	Normal	-
Mar 27, 1974	21.5	35	Moist	Normal	Onions .75" diameter
Apr 3, 1974	22	50	Moist	Normal	Stem tops bent over on 50% of plants
Apr 11, 1974	24.5	60	Moist	Normal	Appear to be two varieties
Apr 18, 1974	26	50	Moist	Normal	-
Apr 27, 1974	29	65	Moist	Normal	-
May 1, 1974	31	70	Moist 1" down	Normal	-
May 8, 1974	30	75	Moist	Normal	Some turning yellow-brown

PLOT NO. 3

ONIONS

MAY 8, 1974

GROUND LEVEL



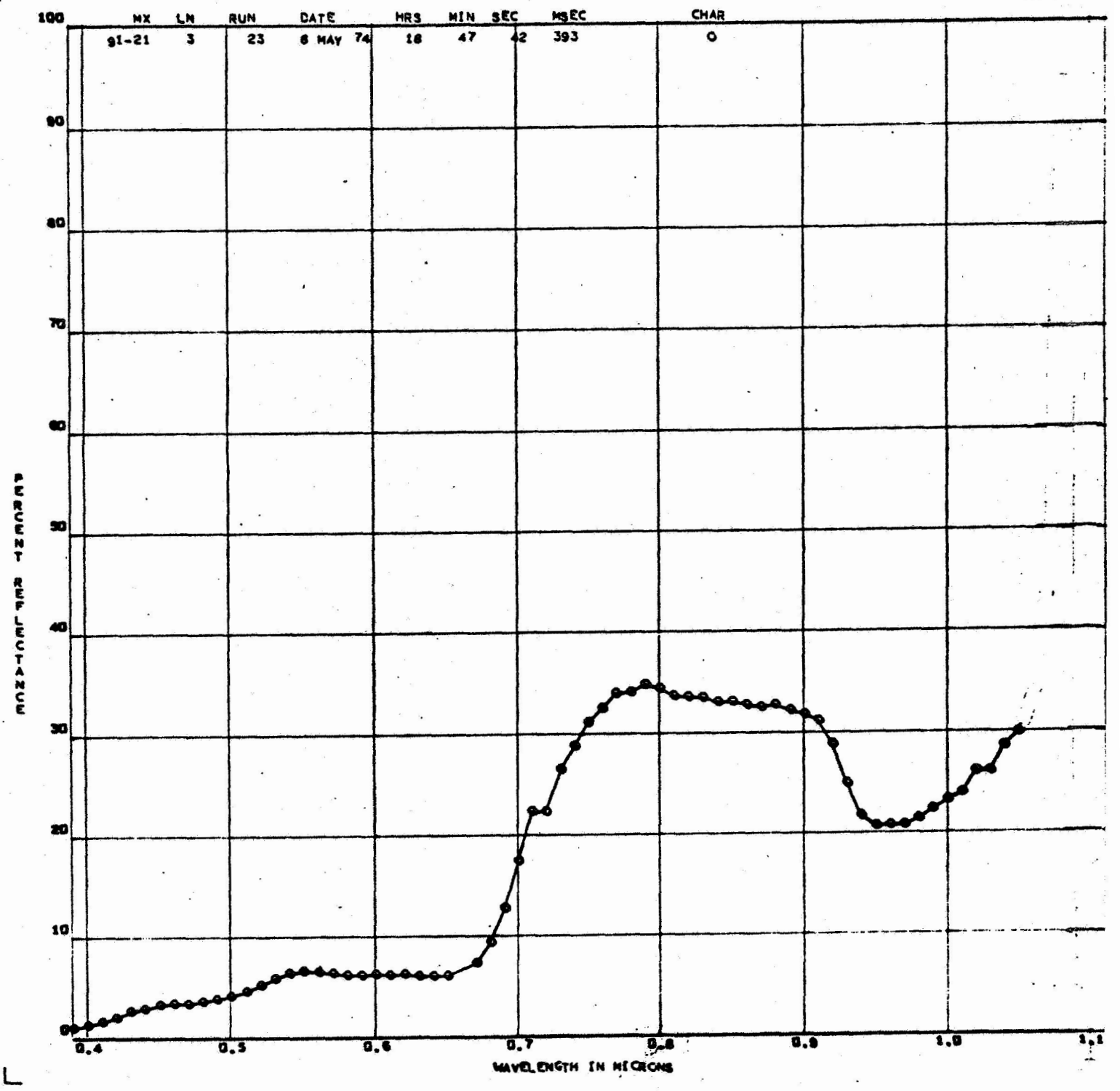
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 3

ONIONS

SPECTROMETER SIGNATURE



PLOT NO. 4

POPPY-1
(Acquisition No. B-40-6-3)

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing and 9" between plants in drill
Nov 9, 1973	Irrigated
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 9"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 4, 1974	Irrigated
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Feb 20, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 15, 1974	Irrigated
Mar 27, 1974	Irrigated
Apr 12, 1974	Hoed weeds
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated

PLOT NO. 4

POPPY-1
(Acquisition No. B-40-6-3)

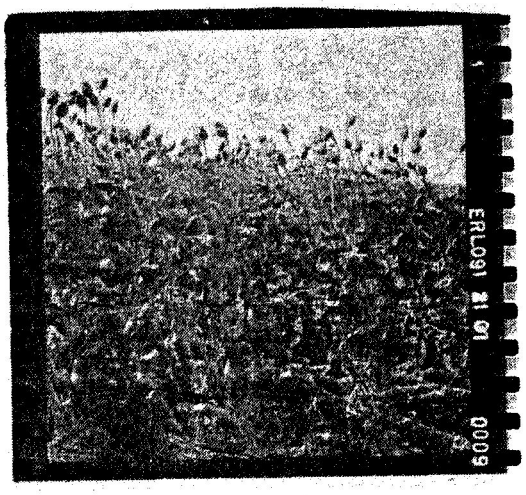
GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1974	.5	1	Moist 1" down	Wilted	Thinned Dec 17
Jan 3, 1974	1.5	5	Moist 1.5" down	-	-
Jan 10, 1974	2	12	Moist .5" down	Normal	-
Jan 14, 1974	3	22	Wet	Normal	-
Jan 25, 1974	5	27	Moist 1" down	Normal	Salt on rows Jan 21, 1974
Jan 30, 1974	7	27	Moist 2" down	Normal	-
Feb 7, 1974	10	30	Wet	Normal	No weeds
Feb 14, 1974	13	40	Moist 1" down	Normal	-
Feb 22, 1974	16	49	-	Normal	-
Feb 28, 1974	20	71	-	Normal	-
Mar 8, 1974	26	75	Moist	Normal	-
Mar 13, 1974	38	85	Moist	Normal	-
Mar 20, 1974	45	95	Moist	Normal	Many purple blossoms
Mar 27, 1974	55	100	Moist	Normal	50% with blossom
Apr 3, 1974	60	100	Moist	Normal	50% of plants laying over, 10% with blossoms
Apr 11, 1974	36	100	Moist	Post blossom	Wind-laid at data point
Apr 18, 1974	45	100	Moist	Post-blossom yellowing	Windblown
Apr 27, 1974	50	95	Moist	Yellow	Drying out
May 1, 1974	52	95	Moist 1" down	Yellow	Dried up, windbl
May 8, 1974	52	90	Moist	Dry plants	Windblown

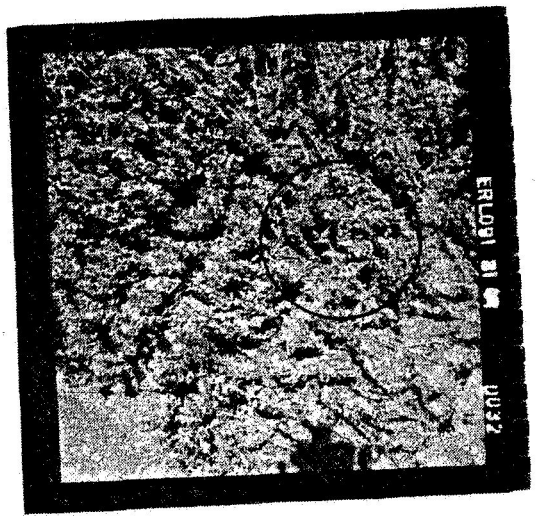
PLOT NO. 4

POPPY-1
(Acquisition No. B-40-6-3)

MAY 8, 1974



GROUND LEVEL



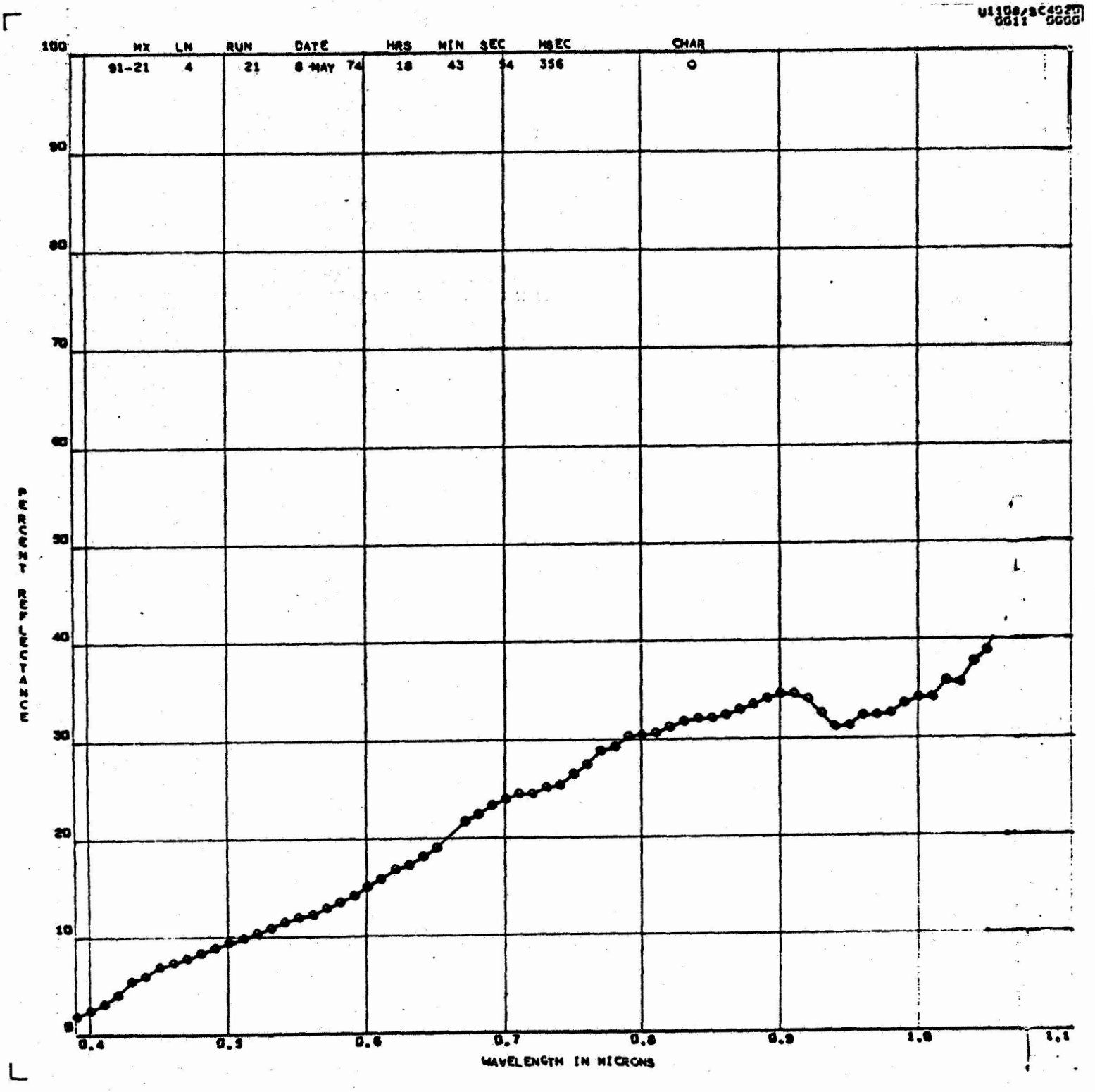
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 4

POPPY-1

SPECTROMETER SIGNATURE



PLOT NO. 5

POPPY-3
(Acquisition No. 371923)

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing and 9" between plants in drill
Nov 9, 1973	Irrigated
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 9"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 4, 1974	Irrigated
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Feb 20, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 15, 1974	Irrigated
Mar 27, 1974	Irrigated
Apr 12, 1974	Hoed weeds
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated

PLOT NO. 5

- POPPY-3
(Acquisition No. 371923)

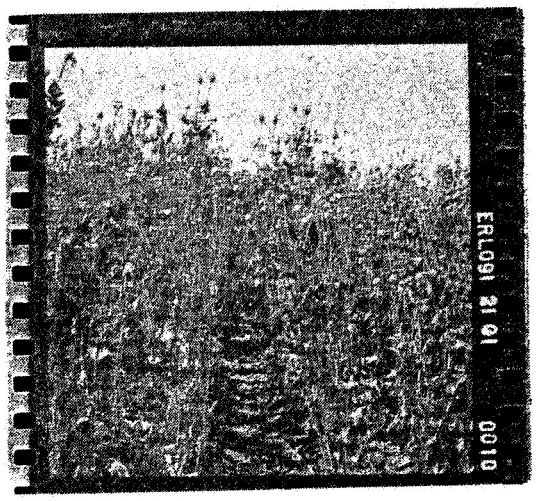
GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973	5	1	Moist 1" down	Wilted	Thinned Dec 17
Jan 3, 1974	-	-	Moist 1.5" down	-	-
Jan 10, 1974	2	12	Moist 1.5" down	Normal	-
Jan 14, 1974	3	22	Wet	Normal	-
Jan 25, 1974	4	25	Moist 1" down	Normal	Salt on rows - Jan 21, 1974
Jan 30, 1974	5	25	Moist 2" down	Normal	-
Feb 7, 1974	8	30	Wet	Normal	No weeds
Feb 14, 1974	10	35	Moist 1" down	Normal	Beginning to bud
Feb 22, 1974	15	48	-	Normal	-
Feb 28, 1974	17	62	-	Normal	Two blossoms
Mar 8, 1974	23	70	Moist	Normal	Many buds
Mar 13, 1974	34	75	Moist	Normal	Many red blossom
Mar 20, 1974	38	90	Moist	Normal	Many blossoms - red, pink, white and purple
Mar 27, 1974	50	97	Moist	Normal	40% with blossom
Apr 3, 1974	52	99	Moist	Normal	40% with blossom
Apr 11, 1974	52	100	Moist	Normal	50% with blossom
Apr 18, 1974	60	100	Moist	Normal	90% post blossom
Apr 27, 1974	55	95	Moist	Normal	Some plants stil flowering, other yellow and dried
May 1, 1974	55	95	Moist 1" down	Yellowing	Few flowers, top open
May 8, 1974	55	95	Moist	Plants are drying	

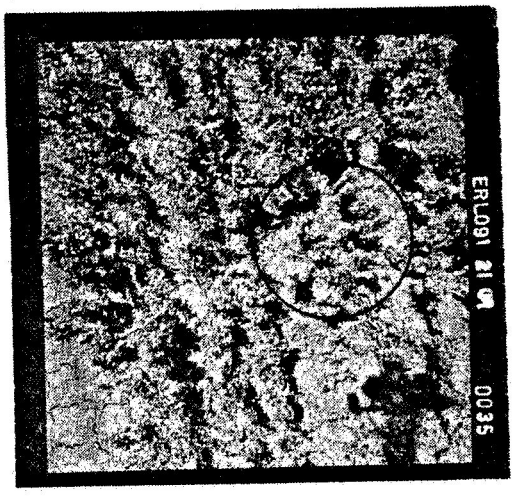
PLOT NO. 5

POPPY-3
(Acquisition No. 371923)

MAY 8. 1974



GROUND LEVEL



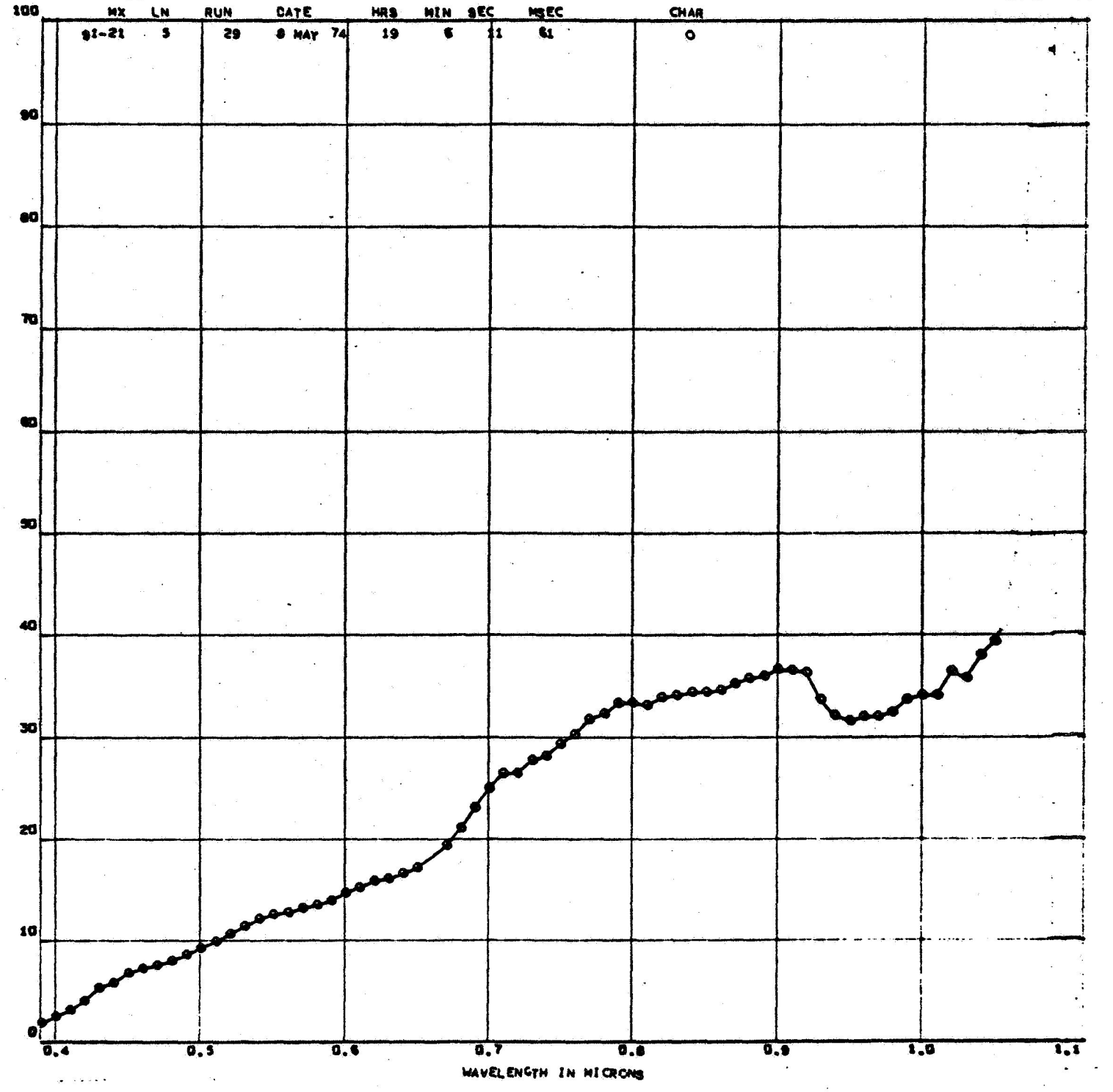
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 5

POPPY-3

SPECTROMETER SIGNATURE



PLOT NO. 6

BARE GROUND
(WET)

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 26, 1973	Cultivated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Feb 20, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 15, 1974	Irrigated
Apr 12, 1974	Hoed weeds
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated

PLOT NO. 6

BARE GROUND (WET)

GROUND TRUTH DATA

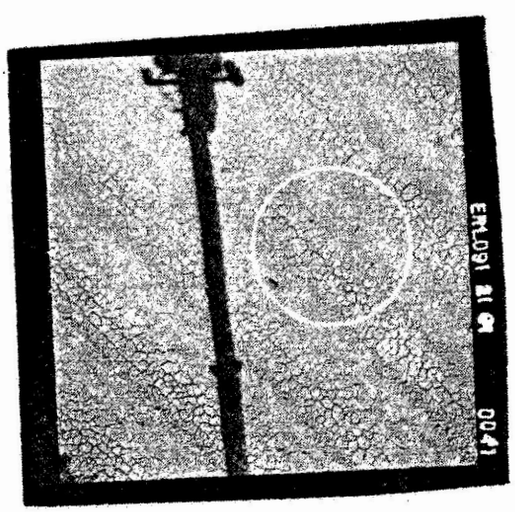
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 12, 1973	-	-	Moist	-	-
Dec 18, 1973	-	-	Moist 1" down	-	-
Jan 3, 1974	-	-	Dry at 6"	-	-
Jan 10, 1974	-	-	Moist .5" down	-	No weeds
Jan 14, 1974	-	-	Dry	-	No weeds
Jan 25, 1974	-	0	Moist 1" down	-	Salt on rows Jan 21, 1974
Jan 30, 1974	-	-	Dry	-	-
Feb 7, 1974	-	-	Dry	-	No weeds
Feb 14, 1974	-	-	-	-	-
Feb 22, 1974	-	0	-	-	-
Feb 28, 1974	-	-	-	-	-
Mar 1, 1974	-	-	-	-	Plot relocated
Mar 13, 1974	-	-	Dry	-	-
Mar 20, 1974	-	-	Dry	-	Some weeds, less than 5% ground cover
Mar 27, 1974	-	-	Dry	-	-
Apr 3, 1974	-	-	-	-	-
Apr 11, 1974	-	-	-	-	-
Apr 18, 1974	-	-	-	-	-
Apr 27, 1974	-	-	-	-	-
May 1, 1974	-	-	Moist	-	-
May 8, 1974	-	-	Moist	-	5% weed cover

PLOT NO. 6

BARE GROUND
(WET)

MAY 8. 1974

GROUND LEVEL



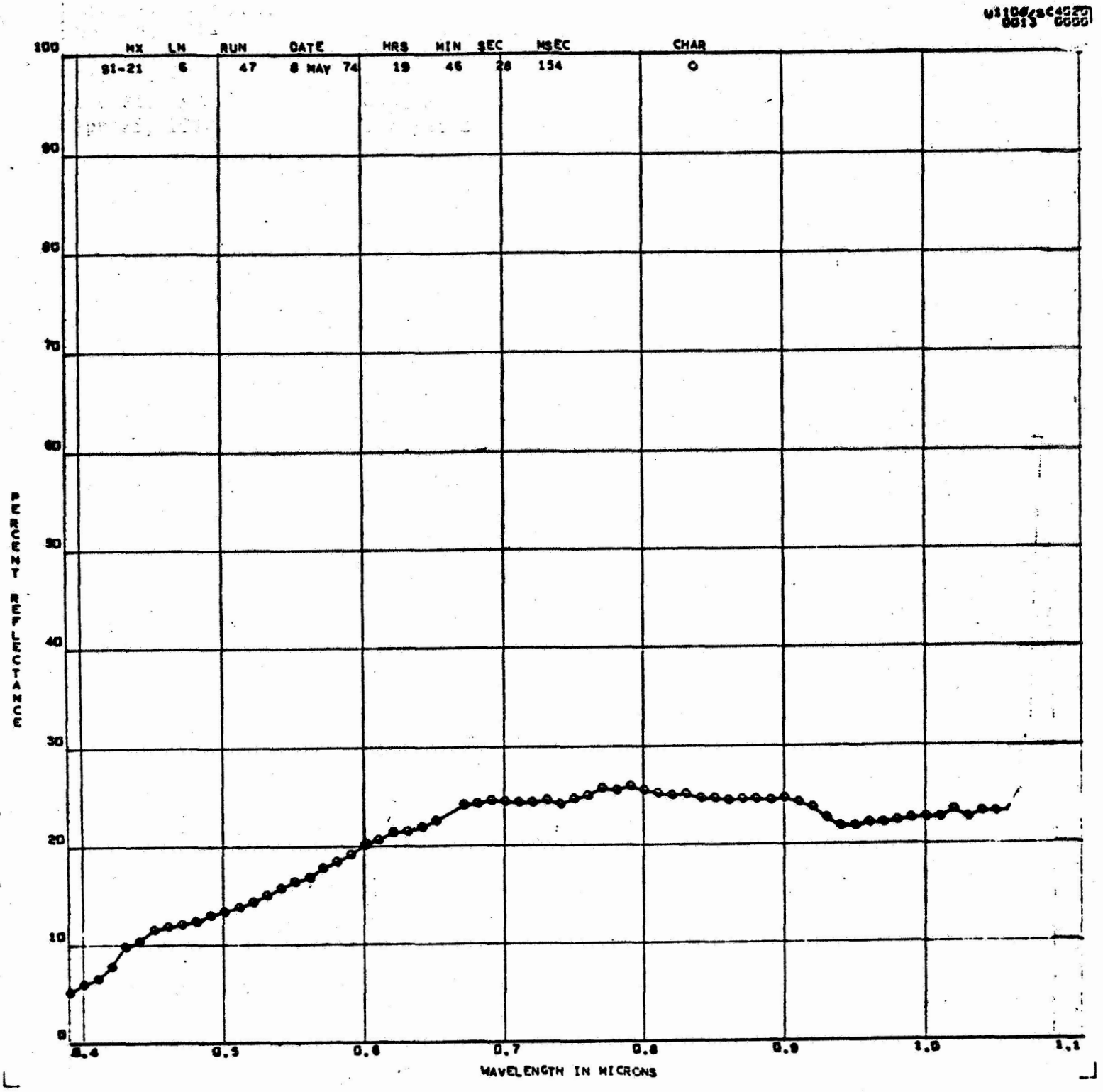
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 6

BARE GROUND
(WET)

SPECTROMETER SIGNATURE



PLOT NO. 7 PINTO BEANS

CROP HISTORY

Feb 22, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain, planted
Mar 20, 1974	Beginning to surface
Apr 8, 1974	Weeded
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated

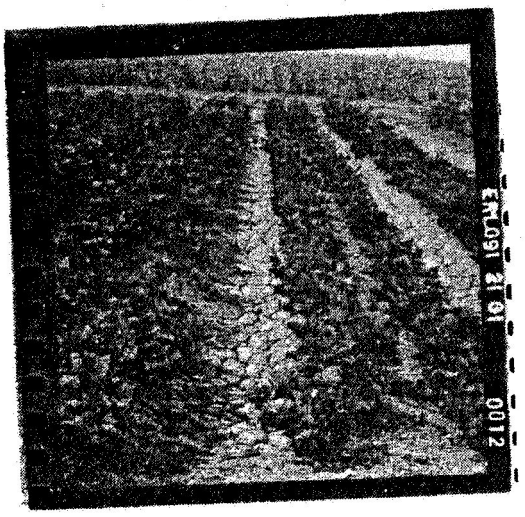
PLOT NO. 7 PINTO BEANS

GROUND TRUTH DATA

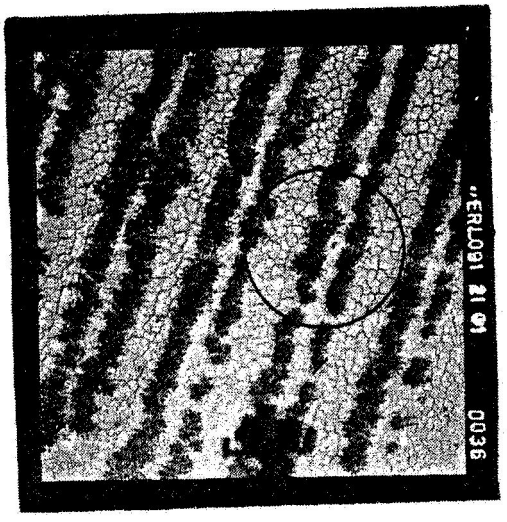
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Apr 11, 1974	5	17	Moist	Normal	-
Apr 18, 1974	8	18	Moist	Normal	-
Apr 27, 1974	9	27	Moist	Normal	Some small white blossoms, tens. = 26 on April 24
May 1, 1974	12	27	Moist 1" down	Normal	Small white blossoms
May 8, 1974	10.5	33	Moist	Normal	Blossoms

PLOT NO. 7 PINTO BEANS

MAY 8, 1974



GROUND LEVEL



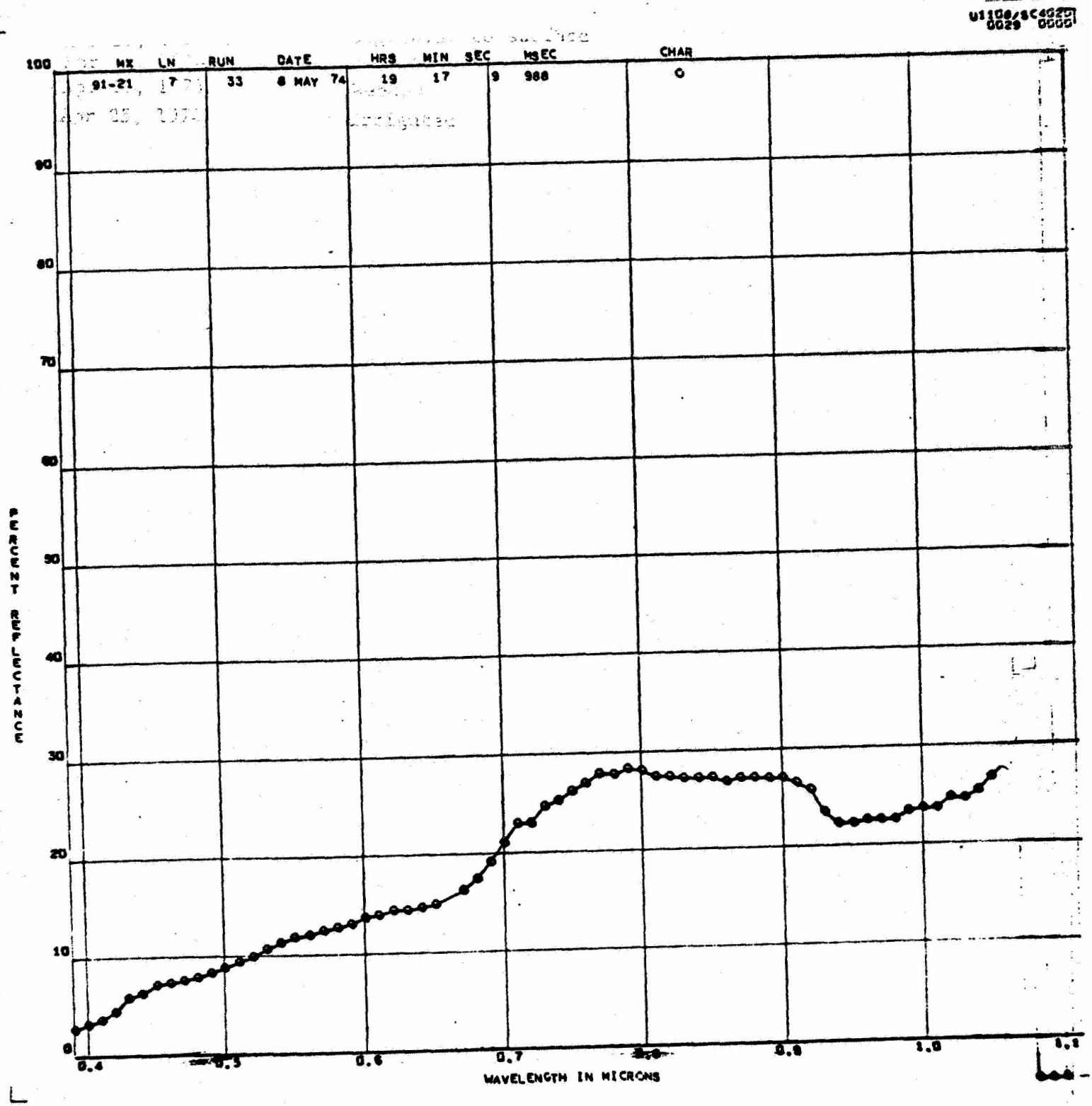
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 7

PINTO BEANS

SPECTROMETER SIGNATURE



PLOT NO. 8 CHILI PEPPER

CROP HISTORY

Feb 22, 1974	Irrigated
Feb 22, 1974	Planted
Mar 8, 1974	Rain
Mar 20, 1974	Beginning to surface
Apr 8, 1974	Weeded
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated

PLOT NO. 8

CHILI

GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Apr 11, 1974	1	1	Moist	Normal	

PLOT NO. 9 SOYBEANS

CROP HISTORY

Feb 22, 1974	Irrigated
Mar 8, 1974	Rain, planted
Mar 20, 1974	Beginning to surface
Apr 8, 1974	Weeded
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated

PLOT NO. 9

SOYBEANS

GROUND TRUTH DATA

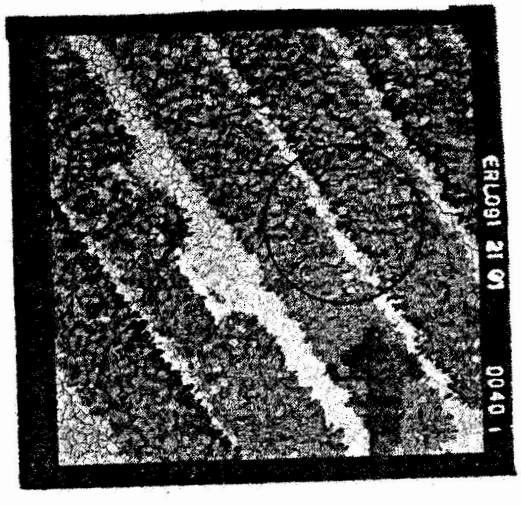
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Apr 11, 1974	5	17	Moist	Normal	
Apr 18, 1974	8	18	Moist	Normal	
Apr 27, 1974	13	30	Moist	Normal	
May 1, 1974	14	45	Moist 1" down	Normal	
May 8, 1974	18	60	Moist	Normal	

PLOT NO. 9

SOYBEANS

MAY 8, 1974

GROUND LEVEL



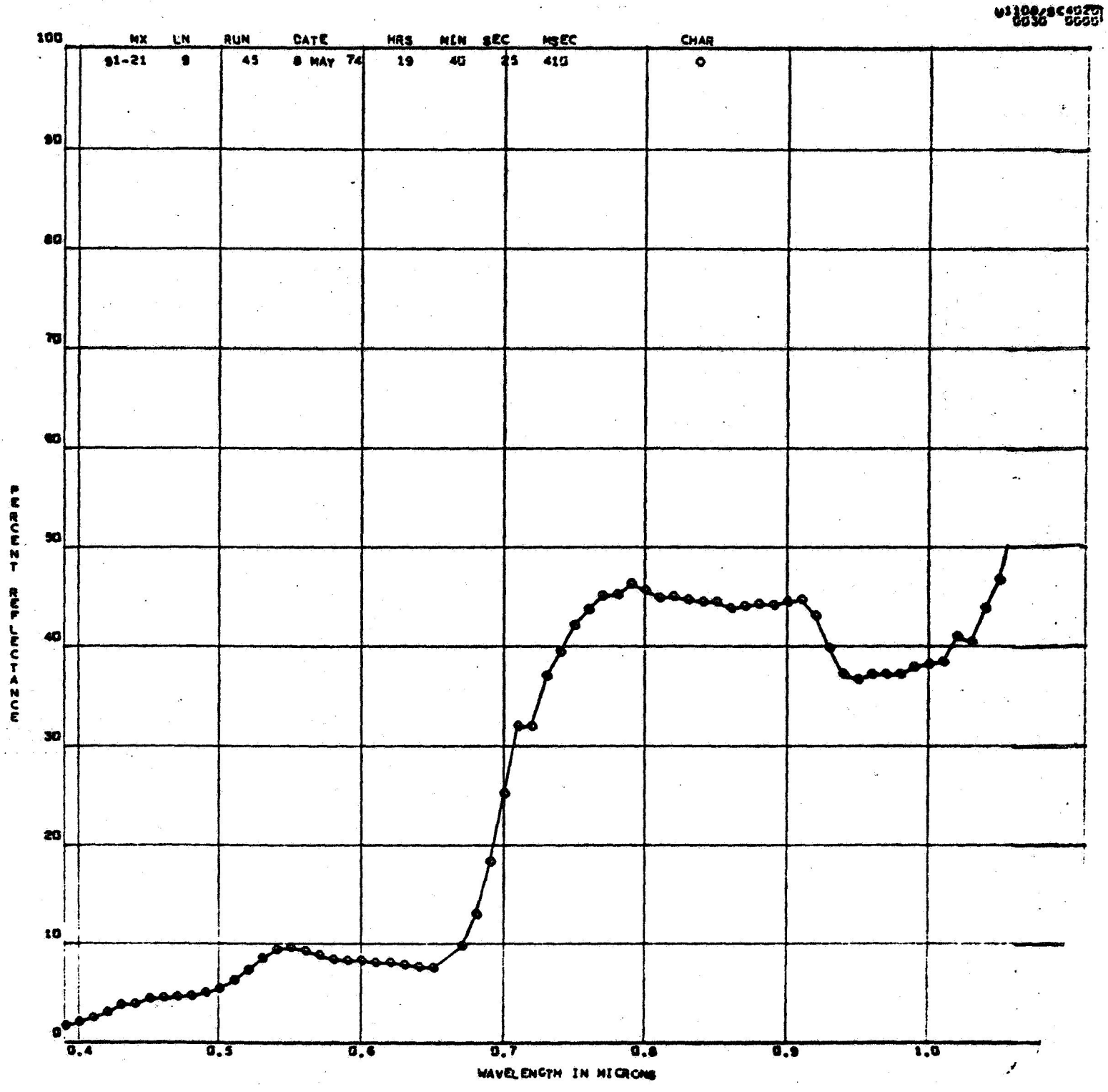
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 9

SOYBEANS

SPECTROMETER SIGNATURE



PLOT NO. 10 ZUCCHINI

CROP HISTORY

Feb 22, 1974	Irrigated
Feb 22, 1974	Planted
Mar 8, 1974	Rain
Mar 15, 1974	Thinned
Apr 8, 1974	Weeded
Apr 12, 1974	Irrigated
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated

PLOT NO. 10

ZUCCHINI

GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Apr 11, 1974	9	10	Moist	Normal	-
Apr 18, 1974	14	15	Moist	Normal	Starting to bloom
Apr 27, 1974	14	17	Moist	Normal	Yellow blossoms, Many fruit
May 1, 1974	19	24	Moist 1" down	Normal	Yellow flowers and fruit
May 8, 1974	19	30	Moist	Normal	Blossoms and fruit

PLOT NO. 10 ZUCCHINI

MAY 8, 1974

GROUND LEVEL

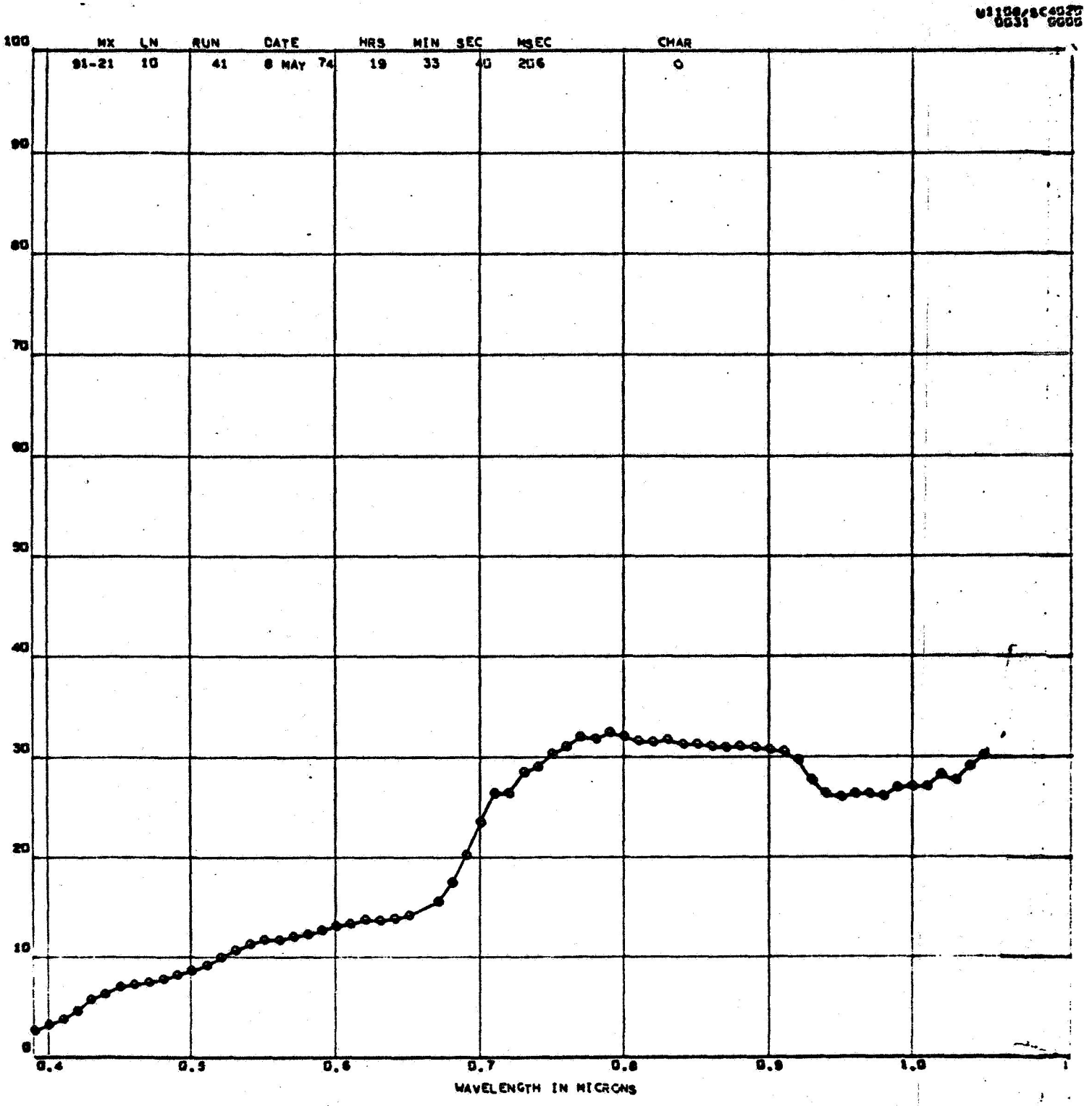
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 10

ZUCCHINI

SPECTROMETER SIGNATURE



PLOT NO. 12 CAULIFLOWER

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing and 24" spacing in drill
Nov 9, 1973	Irrigated
Nov 13, 1973	First emergence
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 24"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Hoed weeds
Jan 28, 1974	Disced fallow portion
Feb 4, 1974	Irrigated
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Feb 20, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 15, 1974	Irrigated
Mar 27, 1974	Irrigated
Apr 12, 1974	Hoed weeds
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated

PLOT NO. 12 CAULIFLOWER

GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 12, 1973	1	6	Moist	Normal	-
Dec 18, 1973	2.5	2	Moist 1" down	Wilted	Thinned Dec 1
Jan 3, 1974	4	-	Moist 1.5" down	Cold-wilted	Few weeds
Jan 10, 1974	6	12	Moist .5" down	Normal	-
Jan 14, 1974	6.5	15	Wet	Normal	-
Jan 25, 1974	9	30	Moist 1" down	Normal	5% weeds, sal row - Jan 21, 197
Jan 30, 1974	9	25	Moist 2" down	Normal	-
Feb 7, 1974	12	25	Wet	Normal	No weeds
Feb 14, 1974	13	27	Moist 1" down	Normal	-
Feb 22, 1974	15	28	-	Normal	-
Feb 28, 1974	19	30	-	Normal	-
Mar 8, 1974	19	33	Moist	Normal	-
Mar 13, 1974	23	45	Moist	Normal	-
Mar 20, 1974	25	50	Moist	Normal	-
Mar 27, 1974	26	75	Moist	Normal	-
Apr 3, 1974	26	85	Moist	Normal	12 plants wit white heads,
Apr 11, 1974	27	90	Moist	Normal	50% with head exposed, heads yellowing
Apr 18, 1974	26	95	Moist	75% heads	Exposed heads yellow
Apr 27, 1974	9	65	Moist	Post-harvest	Stubble

PLOT NO. 13 CARROT

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 4 rows on 40" beds with 4-8-4" spacing
Nov 9, 1973	Irrigated
Nov 21, 1973	Irrigated
Nov 26, 1973	First emergence
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated - Sprayed with Lorax
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 4, 1974	Irrigated
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Feb 20, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 15, 1974	Irrigated
Mar 27, 1974	Irrigated
Apr 12, 1974	Hoed weeds, irrigated
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated

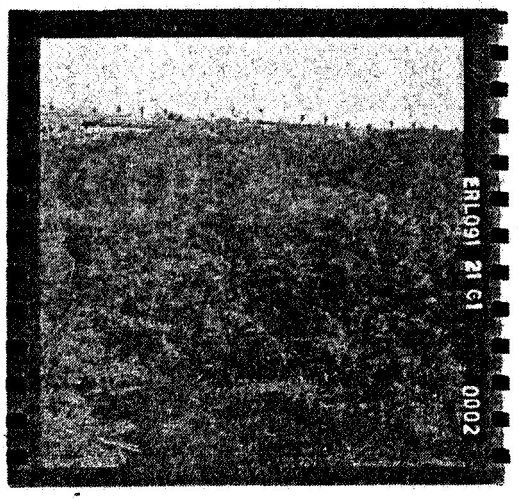
PLOT NO. 13 CARROT

GROUND TRUTH DATA

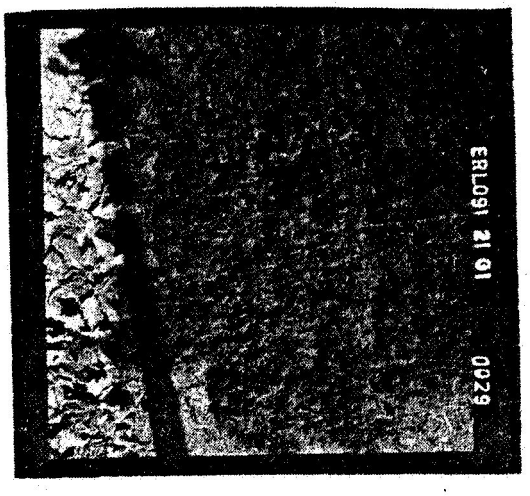
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 12, 1973	.25	-	Moist	Normal	-
Dec 18, 1973	.5	1	Moist 1" down	Normal	-
Jan 3, 1974	1	10	Moist 1.5" down	Normal	1% weeds
Jan 10, 1974	2	30	Moist .5" down	Normal	10% weeds
Jan 14, 1974	2	20	Wet	Normal	7% weeds
Jan 25, 1974	4	31	Moist 1" down	Normal	1% weeds - Tens. = 12 Salt on row Jan 21, 1974
Jan 30, 1974	2	31	Moist 2" down	Normal	-
Feb 7, 1974	5	35	Wet	Normal	No weeds, tens.=
Feb 14, 1974	7	40	Moist 1" down	Normal	-
Feb 22, 1974	8	46	-	Normal	Small white blossoms, tens. 10 on Feb 11, 15 Feb 13, 14 Feb 1 28 Feb 19, 37 Feb 20
Feb 28, 1974	9	48	-	Normal	-
Mar 8, 1974	10	51	Moist	Normal	-
Mar 13, 1974	14	55	Moist	Normal	Tens. = 28 on Feb 28, 45 Mar 4 63 Mar 6, 29 Mar 13, 31 Mar 15
Mar 20, 1974	16	70	Moist	Normal	-
Mar 27, 1974	16.5	90	Moist	Normal	Tens. = 17 on Ma 19, 20 Mar 21
Apr 3, 1974	19	100	Moist	Normal	-
Apr 11, 1974	21	100	Moist	Normal	-
Apr 18, 1974	21	100	Moist	Normal	-
Apr 27, 1974	22	100	Moist	Normal	Beginning to see
May 1, 1974	21	100	Moist 1" down	Normal	Partially gone t seed
May 8, 1974	21	100	Moist	Going to seed	-

PLOT NO. 13 CARROT

MAY 8, 1974



GROUND LEVEL



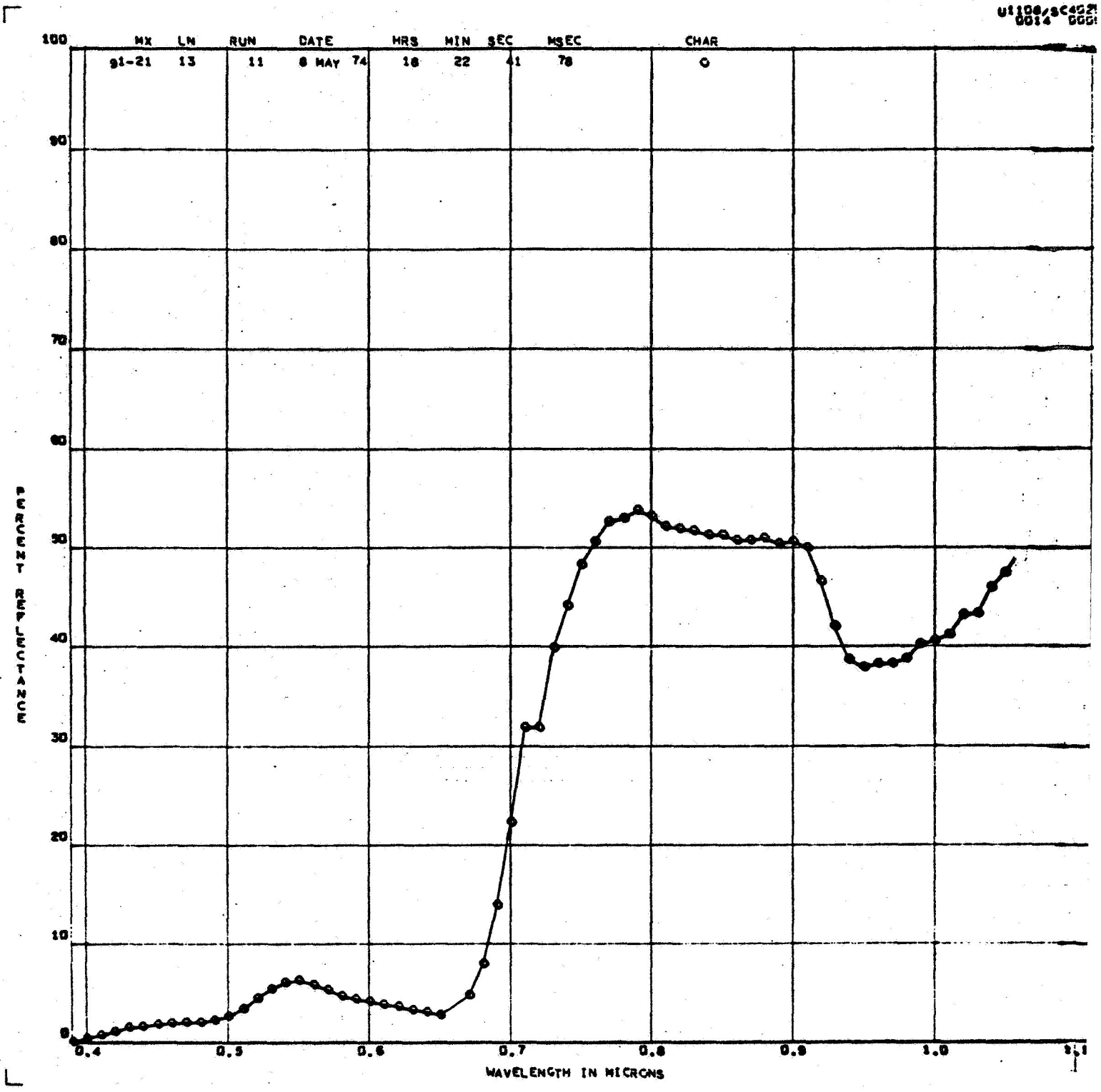
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 13

CARROT

SPECTROMETER SIGNATURE



PLOT NO. 14 CHICK PEAS

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Dec 4, 1973	Planted 2 rows on 40" bed with 12" spacing
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 26, 1973	First emergence - Cultivated
Jan 7, 1974	Poor stand
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Transplanted for proper stand - Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 4, 1974	Irrigated
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Feb 20, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 15, 1974	Irrigated
Mar 27, 1974	Irrigated
Apr 12, 1974	Irrigated
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated
May 3, 1974	Undercut

PLOT NO. 14 CHICK PEAS

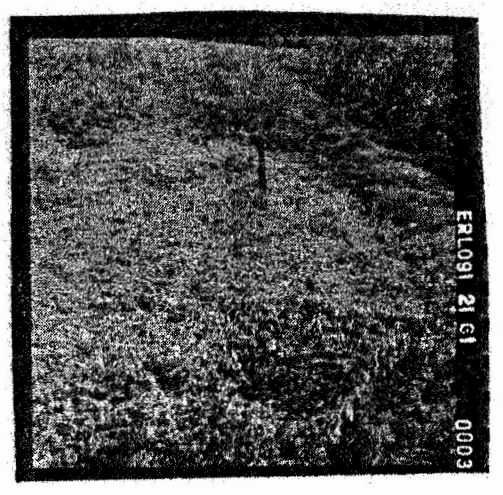
GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 12, 1973	--	-	Moist	-	-
Dec 18, 1973	-	0	Moist 1" down	-	-
Jan 3, 1974	1-2	2	Moist 1.5" down	Normal	-
Jan 10, 1974	2.5	3	Moist .5" down	Normal	Poor stand
Jan 14, 1974	4	6	Wet	Normal	Transplanted fo: good stand
Jan 25, 1974	4	10	Moist 1" down	Normal	Salt on rows - Jan 21, 1974
Jan 30, 1974	5	8	Moist 2" down	Normal	-
Feb 7, 1974	7	20	Wet	Normal	No weeds
Feb 14, 1974	8	20	Moist 1" down	Normal	Beginning to bloom, poor sta
Feb 22, 1974	10	24	-	Normal	-
Feb 28, 1974	12	31	-	Normal	Small white - blossoms
Mar 8, 1974	15	49	Moist	Normal	Small white - blossoms
Mar 13, 1974	16	70	Moist	Normal	Small white - blossoms and po
Mar 20, 1974	19	90	Moist	Normal	Small white - blossoms and po
Mar 27, 1974	22	95	Moist	Normal	Pods and white blossoms
Apr 3, 1974	23	100	Moist	25% of plants with yellowing leaves	-
Apr 11, 1974	24	100	Moist	50% of plants are yellowing	-
Apr 18, 1974	22	100	Moist	90% yellow	30% weeds
Apr 27, 1974	22	90	Moist	Maturing	-
May 1, 1974	19	80	Moist 1" down	Yellowing, drying	Ready to cut
May 8, 1974	-	50	Moist	Ready for harvest	Undercut, laying on ground

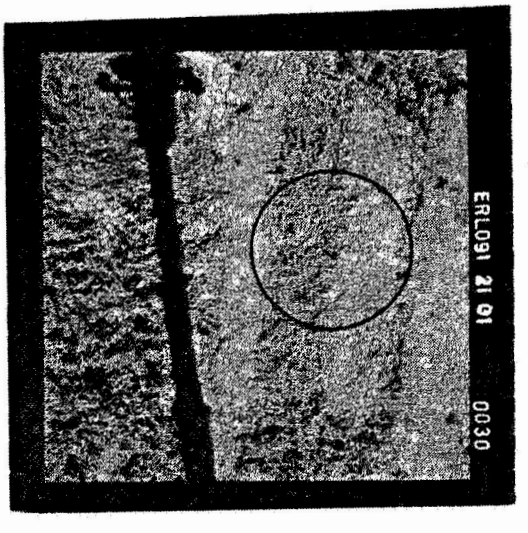
PLOT NO. 14

CHICK PEAS

MAY 8, 1974



GROUND LEVEL



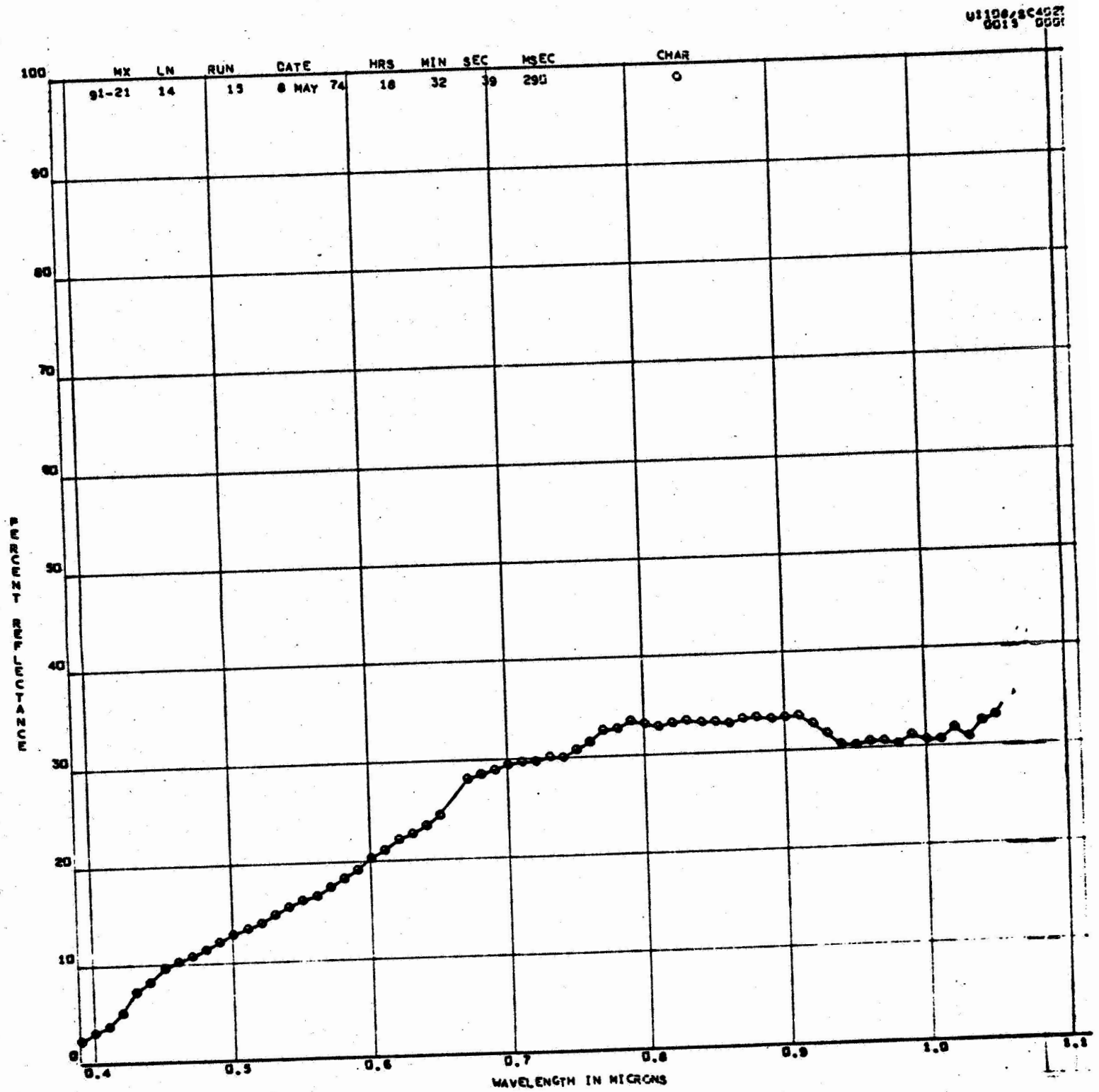
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 14

CHICK PEAS

SPECTROMETER SIGNATURE



PLOT NO. 15

POPPY-2
(Acquisition No. M-89)

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing and 9" spacing in drill
Nov 9, 1973	Irrigated
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 9"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 4, 1974	Irrigated
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Feb 20, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 15, 1974	Irrigated
Mar 27, 1974	Irrigated
Apr 12, 1974	Hoed weeds
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated

PLOT NO. 15

- POPPY-2
(Acquisition No. M-89)

GROUND TRUTH DATA

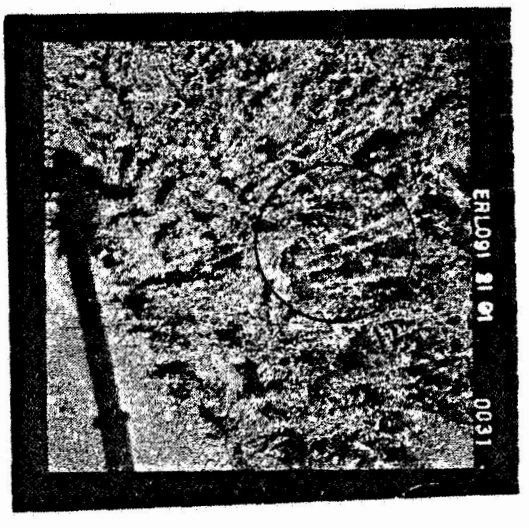
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973	1	1	Moist 1" down	Wilted	Thinned Dec 17
Jan 3, 1974	1.5	5	Moist 1.5" down	Normal	-
Jan 10, 1974	2	10	Moist .5" down	Normal	-
Jan 14, 1974	3	22	Wet	Normal	-
Jan 25, 1974	5	23	Moist 1" down	Normal	Salt on rows Jan 21, 1974
Jan 30, 1974	6	25	Moist 2" down	Normal	-
Feb 7, 1974	8	45	Wet	Normal	No weeds, tens. = 38
Feb 14, 1974	12	40	Moist 1" down	Normal	-
Feb 22, 1974	16	52	-	Normal	Tens. = 13 on Fe 11, 16 Feb 13, 1 Feb 15, 32 Feb 1 38 Feb 20
Feb 28, 1974	19	71	-	Normal	-
Mar 8, 1974	24	80	Moist	Normal	-
Mar 13, 1974	34	90	Moist	Normal	One white blosso tens. = 21 on Fe 28, 48 Mar 4, 64 Mar 6, 24 Mar 13 31 Mar 15
Mar 20, 1974	45	95	Moist	Normal	Several white - blossoms
Mar 27, 1974	56	100	Moist	Normal	50% with blossom tens. = 10 on Ma 19, 16 Mar 21
Apr 3, 1974	60	100	Moist	Normal	25% of plants laying over from wind, 15% with blossoms
Apr 11, 1974	50	100	Moist	Normal	Windblown at data point
Apr 18, 1974	55	100	Moist	Yellowing, post-blossom	Windblown
Apr 27, 1974	52	95	Moist	Yellowing	Drying out
May 1, 1974	52	95	Moist 1" down	Yellow, drying	Windblown at data point
May 8, 1974	52	95	Moist	-	Windblown

PLOT NO. 15

POPPY-2
(Acquisition No. M-89)

MAY 8, 1974

GROUND LEVEL



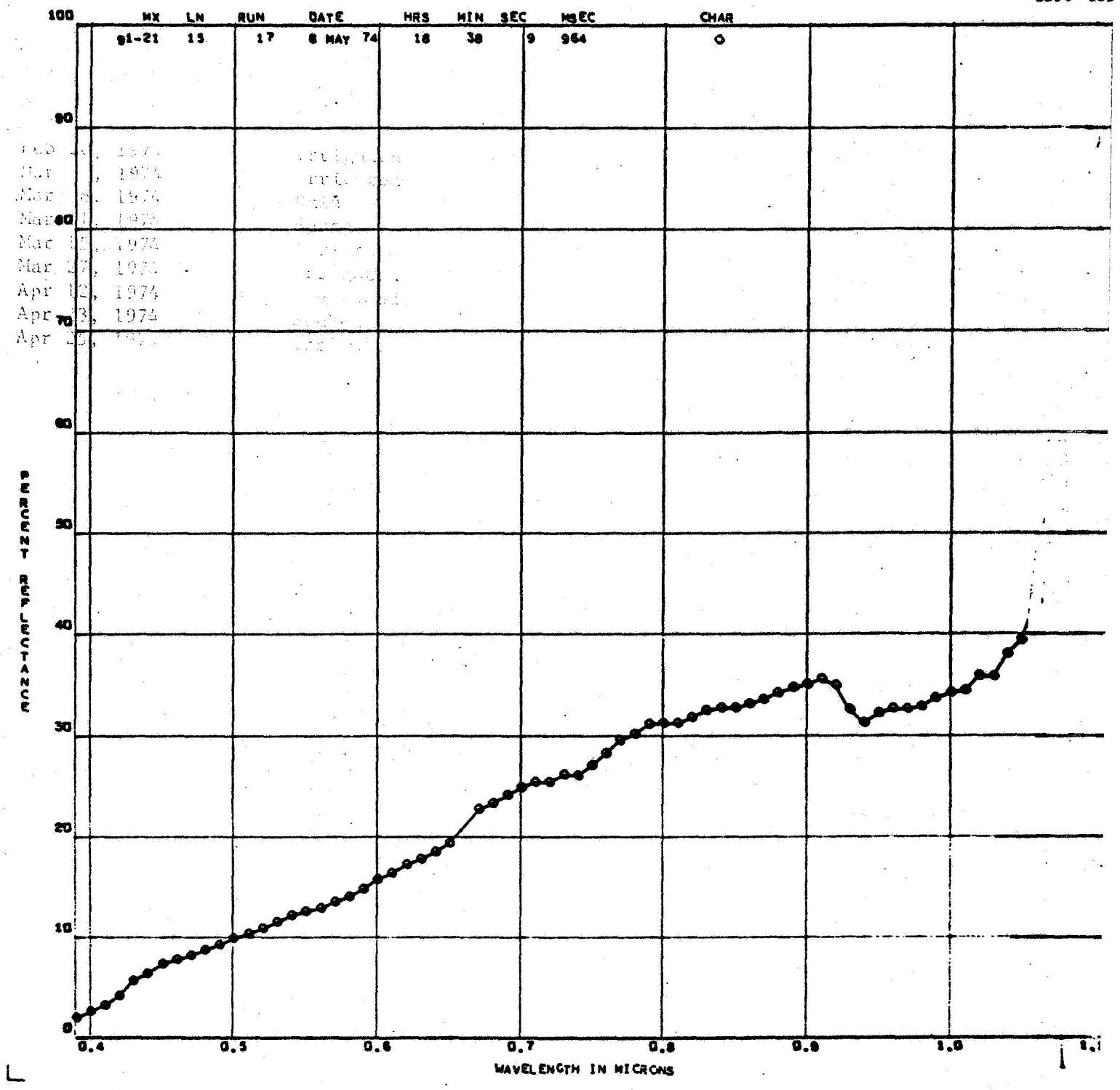
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 15

POPIX-2

SPECTROMETER SIGNATURE



PLOT NO. 16

POPPY-4
(Mixture of 1, 2, 3)

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing and 9" spacing in drill
Nov 9, 1973	Irrigated
Nov 13, 1973	First emergence
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 9"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 4, 1974	Irrigated
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Feb 20, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 15, 1974	Irrigated
Mar 27, 1974	Irrigated
Apr 12, 1974	Hoed weeds
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated

PLOT NO. 16

POPPY-4
(Mixture of 1, 2, 3)

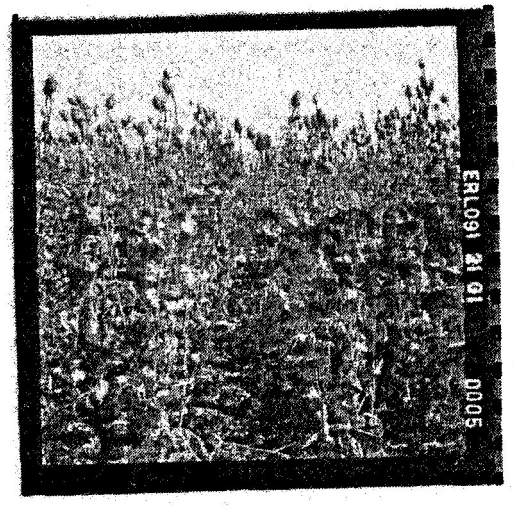
GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 12, 1973	.5	-	Moist	Normal	-
Dec 18, 1973	1	1	Moist 1" down	Normal	Thinned Dec 12
Jan 3, 1974	1	3	Moist 1.5" down	Normal	-
Jan 10, 1974	2	10	Moist .5" down	Normal	-
Jan 14, 1974	2.5	20	Wet	Normal	-
Jan 25, 1974	4	20	Moist 1" down	Normal	Salt on rows - Jan 21, 1974
Jan 30, 1974	6	23	Moist 2" down	Normal	-
Feb 7, 1974	7	35	Wet	Normal	No weeds
Feb 14, 1974	10	35	Moist 1" down	Normal	-
Feb 22, 1974	15	49	-	Normal	-
Feb 28, 1974	18	59	-	Normal	-
Mar 8, 1974	20	65	Moist	Normal	-
Mar 13, 1974	32	75	Moist	Normal	-
Mar 20, 1974	44	85	Moist	Normal	Several blossoms red - purple
Mar 27, 1974	56	97	Moist	Normal	45% with blossoms
Apr 3, 1974	60	100	Moist	Normal	15% with blossoms
Apr 11, 1974	60	98	Moist	Post - blossom	-
Apr 18, 1974	60	97	Moist	Yellowing post-blossom	-
Apr 27, 1974	55	95	Moist	Yellowing	Few blossoms
May 1, 1974	55	95	Moist 1" down	Yellow, dry	Few flowers
May 8, 1974	55	95	Moist	Mostly dry	-

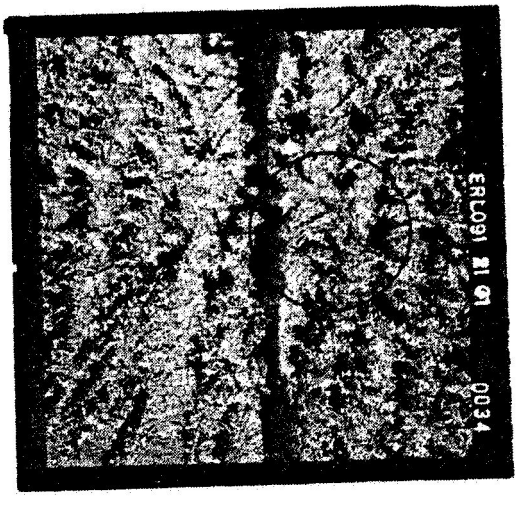
PLOT NO. 16

POPPY-4
(Mixture of Poppy 1, 2, 3,)

MAY 8, 1974



GROUND LEVEL



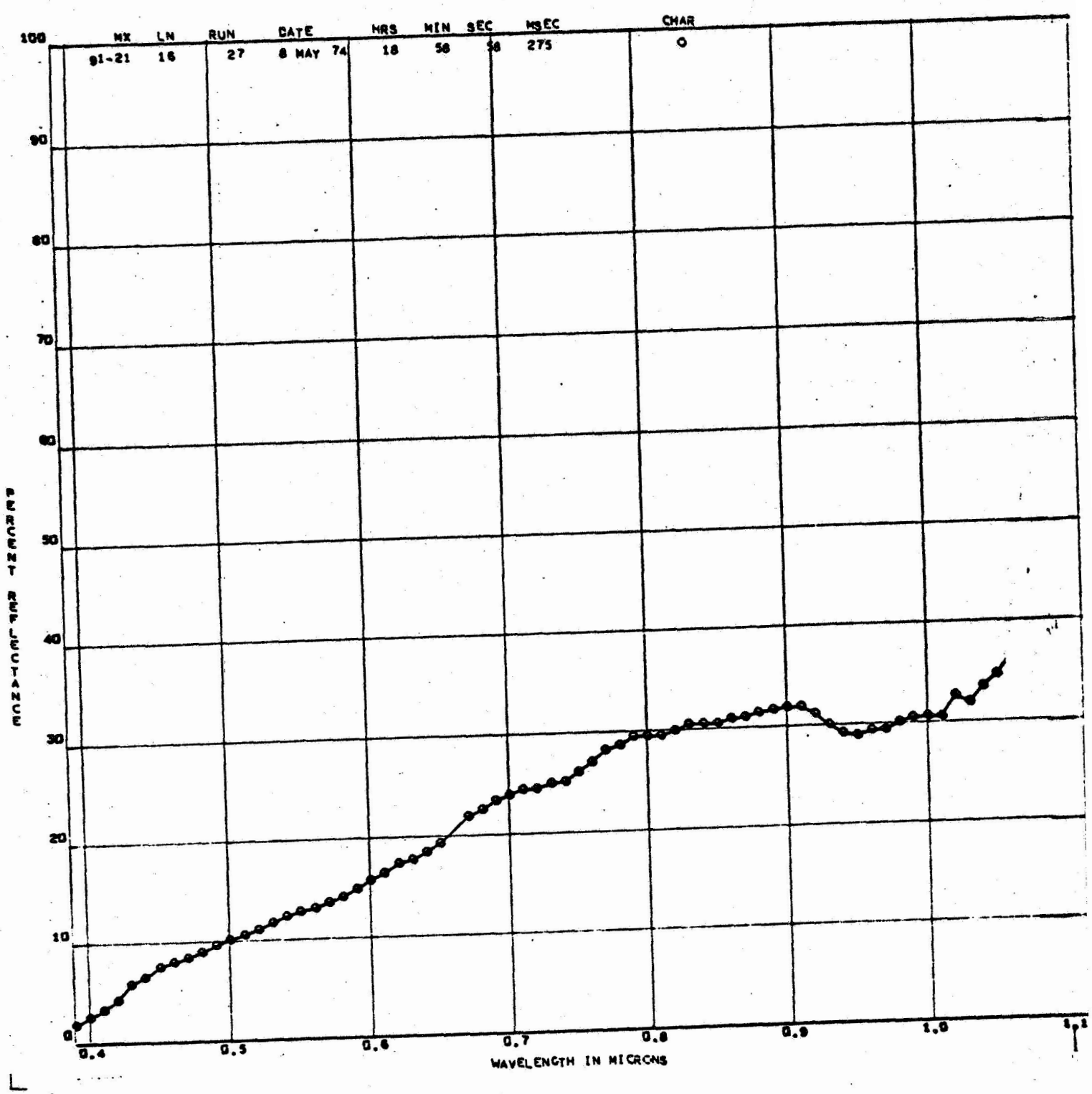
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 16

POPPY-4

SPECTROMETER SIGNATURE



PLOT NO. 17

POPPY-6
(Acquisition No. B-40-6-3)

CROP HISTORY

Nov 6, 1973		Fertilized with 50 lbs N/Ac			
Nov 7, 1973		Planted 2 rows on 40" beds with 12" spacing and 9" spacing in dri			
Nov 9, 1973		Irrigated			
Nov 15, 1973		Up to a stand			
Dec 7, 1973		Fertilized with 50lbs N/Ac - Irrigated			
Dec 17, 1973		Thinned to 9"			
Dec 26, 1973		Cultivated			
Jan 11, 1974		Sidedressed with 50 lbs N/Ac			
Jan 15, 1974		Irrigated			
Jan 28, 1974		Hoed weeds			
Jan 29, 1974		Disced fallow portion			
Feb 4, 1974		Irrigated			
Feb 14, 1974		Furrows cultivated			
Feb 15, 1974		Irrigated			
Feb 20, 1974	16	Irrigated	52	-	Normal
Mar 7, 1974		Irrigated	59	Moist	Normal
Mar 8, 1974		Rain	75	Moist	Normal
Mar 11, 1974		Sprayed with phosdrin			
Mar 15, 1974		Irrigated			
Mar 27, 1974	56	Irrigated	97	Moist	Normal
Apr 12, 1974	60	Hoed weeds	97	Moist	Normal
Apr 23, 1974	60		95	Moist	Post-blossom
Apr 25, 1974	52	Weeded Irrigated	95	Moist	Post-blossom

Nov 6, 1973		Fertilized with 50 lbs N/Ac		
Nov 7, 1973		Planted 2 rows on 40" beds with 12" spacing and 9" spacing in dri		
Nov 9, 1973		Irrigated		
Nov 15, 1973		Up to a stand		
Dec 7, 1973		Fertilized with 50lbs N/Ac - Irrigated		
Dec 17, 1973		Thinned to 9"		
Dec 26, 1973		Cultivated		
Jan 11, 1974		Sidedressed with 50 lbs N/Ac		
Jan 15, 1974		Irrigated		
Jan 28, 1974		Hoed weeds		
Jan 29, 1974		Disced fallow portion		
Feb 4, 1974		Irrigated		
Feb 14, 1974		Furrows cultivated		
Feb 15, 1974		Irrigated		
Feb 20, 1974	16	Irrigated	-	Normal
Mar 7, 1974		Irrigated	Moist	Normal
Mar 8, 1974		Rain	Moist	Normal
Mar 11, 1974		Sprayed with phosdrin		
Mar 15, 1974		Irrigated		
Mar 27, 1974	56	Irrigated	Moist	Normal
Apr 12, 1974	60	Hoed weeds	Moist	Normal
Apr 23, 1974	60		Moist	Post-blossom
Apr 25, 1974	52	Weeded Irrigated	Moist	Post-blossom

Nov 6, 1973		Fertilized with 50 lbs N/Ac			
Nov 7, 1973		Planted 2 rows on 40" beds with 12" spacing and 9" spacing in dri			
Nov 9, 1973		Irrigated			
Nov 15, 1973		Up to a stand			
Dec 7, 1973		Fertilized with 50lbs N/Ac - Irrigated			
Dec 17, 1973		Thinned to 9"			
Dec 26, 1973		Cultivated			
Jan 11, 1974		Sidedressed with 50 lbs N/Ac			
Jan 15, 1974		Irrigated			
Jan 28, 1974		Hoed weeds			
Jan 29, 1974		Disced fallow portion			
Feb 4, 1974		Irrigated			
Feb 14, 1974		Furrows cultivated			
Feb 15, 1974		Irrigated			
Feb 20, 1974	16	Irrigated	52	-	Normal
Mar 7, 1974		Irrigated	59	Moist	Normal
Mar 8, 1974		Rain	75	Moist	Normal
Mar 11, 1974		Sprayed with phosdrin			
Mar 15, 1974		Irrigated			
Mar 27, 1974	56	Irrigated	97	Moist	Normal
Apr 12, 1974	60	Hoed weeds	97	Moist	Normal
Apr 23, 1974	60		95	Moist	Post-blossom
Apr 25, 1974	52	Weeded Irrigated	95	Moist	Post-blossom

Nov 6, 1973		Fertilized with 50 lbs N/Ac			
Nov 7, 1973		Planted 2 rows on 40" beds with 12" spacing and 9" spacing in dri			
Nov 9, 1973		Irrigated			
Nov 15, 1973		Up to a stand			
Dec 7, 1973		Fertilized with 50lbs N/Ac - Irrigated			
Dec 17, 1973		Thinned to 9"			
Dec 26, 1973		Cultivated			
Jan 11, 1974		Sidedressed with 50 lbs N/Ac			
Jan 15, 1974		Irrigated			
Jan 28, 1974		Hoed weeds			
Jan 29, 1974		Disced fallow portion			
Feb 4, 1974		Irrigated			
Feb 14, 1974		Furrows cultivated			
Feb 15, 1974		Irrigated			
Feb 20, 1974	16	Irrigated	52	-	Normal
Mar 7, 1974		Irrigated	59	Moist	Normal
Mar 8, 1974		Rain	75	Moist	Normal
Mar 11, 1974		Sprayed with phosdrin			
Mar 15, 1974		Irrigated			
Mar 27, 1974	56	Irrigated	97	Moist	Normal
Apr 12, 1974	60	Hoed weeds	97	Moist	Normal
Apr 23, 1974	60		95	Moist	Post-blossom
Apr 25, 1974	52	Weeded Irrigated	95	Moist	Post-blossom

Nov 6, 1973		Fertilized with 50 lbs N/Ac			
Nov 7, 1973		Planted 2 rows on 40" beds with 12" spacing and 9" spacing in dri			
Nov 9, 1973		Irrigated			
Nov 15, 1973		Up to a stand			
Dec 7, 1973		Fertilized with 50lbs N/Ac - Irrigated			
Dec 17, 1973		Thinned to 9"			
Dec 26, 1973		Cultivated			
Jan 11, 1974		Sidedressed with 50 lbs N/Ac			
Jan 15, 1974		Irrigated			
Jan 28, 1974		Hoed weeds			
Jan 29, 1974		Disced fallow portion			
Feb 4, 1974		Irrigated			
Feb 14, 1974		Furrows cultivated			
Feb 15, 1974		Irrigated			
Feb 20, 1974	16	Irrigated	52	-	Normal
Mar 7, 1974		Irrigated	59	Moist	Normal
Mar 8, 1974		Rain	75	Moist	Normal
Mar 11, 1974		Sprayed with phosdrin			
Mar 15, 1974		Irrigated			
Mar 27, 1974	56	Irrigated	97	Moist	Normal
Apr 12, 1974	60	Hoed weeds	97	Moist	Normal
Apr 23, 1974	60		95	Moist	Post-blossom
Apr 25, 1974	52	Weeded Irrigated	95	Moist	Post-blossom

PLOT NO. 17

POPPY-6
(Acquisition No. B-40-6-3)

GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973	1	1	Moist 1" down	Wilted	Thinned Dec 12
Jan 3, 1974	1-2	4	Moist 1.5" down	Normal	-
Jan 10, 1974	2	10	Moist .5" down	Normal	-
Jan 14, 1974	2.5	20	Wet	Normal	-
Jan 25, 1974	5	22	Moist 1" down	Normal	Salt on rows Jan 21, 1974
Jan 30, 1974	6	35	Moist 2" down	Normal	-
Feb 7, 1974	7	30	Wet	Normal	No weeds
Feb 14, 1974	11	38	Moist 1" down	Normal	-
Feb 22, 1974	14.5	48	-	Normal	-
Feb 28, 1974	16	52	-	Normal	-
Mar 8, 1974	16	59	Moist	Normal	-
Mar 13, 1974	33	75	Moist	Normal	-
Mar 20, 1974	44	80	Moist	Normal	Two purple blossoms
Mar 27, 1974	56	97	Moist	Normal	50% with blossoms
Apr 3, 1974	60	97	Moist	Normal	50% with blossoms
Apr 11, 1974	60	95	Moist	Post-blossom	-
Apr 18, 1974	52	95	Moist	Post-blossom	Brown bulbs due to paraquot spray

PLOT NO. 18 POPPY-5

CROP HISTORY

Feb 22, 1974	Irrigated
Feb 22, 1974	Planted
Mar 8, 1974	Rain
Mar 20, 1974	Beginning to surface
Apr 8, 1974	Weeded
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated

PLOT NO. 18

POPPY-5

GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Apr 11, 1974	2	5	Moist	Normal	-

PLOT NO. 19 TOMATO

CROP HISTORY

Feb 22, 1974	Irrigated
Feb 22, 1974	Planted
Mar 8, 1974	Rain
Mar 20, 1974	Beginning to surface
Apr 8, 1974	Weeded
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated

PLOT NO: 19

TOMATO

GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Apr 11, 1974	.4	3	Moist	Normal	- Tens. = 12 on April 24

PLOT NO. 20 SESAME

CROP HISTORY

Feb 22, 1974	Irrigated
Mar 8, 1974	Rain
Apr 11, 1974	Plot not planted yet
Apr 23, 1974	Weeded
Apr 25, 1974	Planted, irrigated

PLOT NO: 20

SESAME

GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Apr 11, 1974	-	-	-	-	No E-20 D data

PLOT NO. 21 BANANA SQUASH

CROP HISTORY

Feb 22, 1974	Irrigated
Feb 22, 1974	Planted
Mar 8, 1974	Rain
Mar 15, 1974	Thinned
Apr 8, 1974	Weeded
Apr 12, 1974	Irrigated
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated

PLOT NO. 21

BANANA SQUASH

GROUND TRUTH DATA

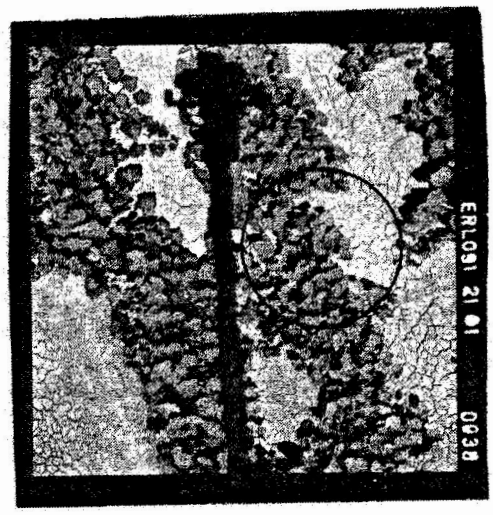
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Apr 11, 1974	10.5	12	Moist	Normal	-
Apr 18, 1974	14	17	Moist	Normal	-
Apr 27, 1974	16	20	Moist	Normal	Yellow blossoms, some fruit, tens. 20 plus on Apr 24
May 1, 1974	17	30	Moist 1" down	Normal	Yellow flowers an fruit
May 8, 1974	19	55	Moist	Normal	Blossoms and fruit

PLOT NO. 21

BANANA SQUASH

MAY 8, 1974

GROUND LEVEL



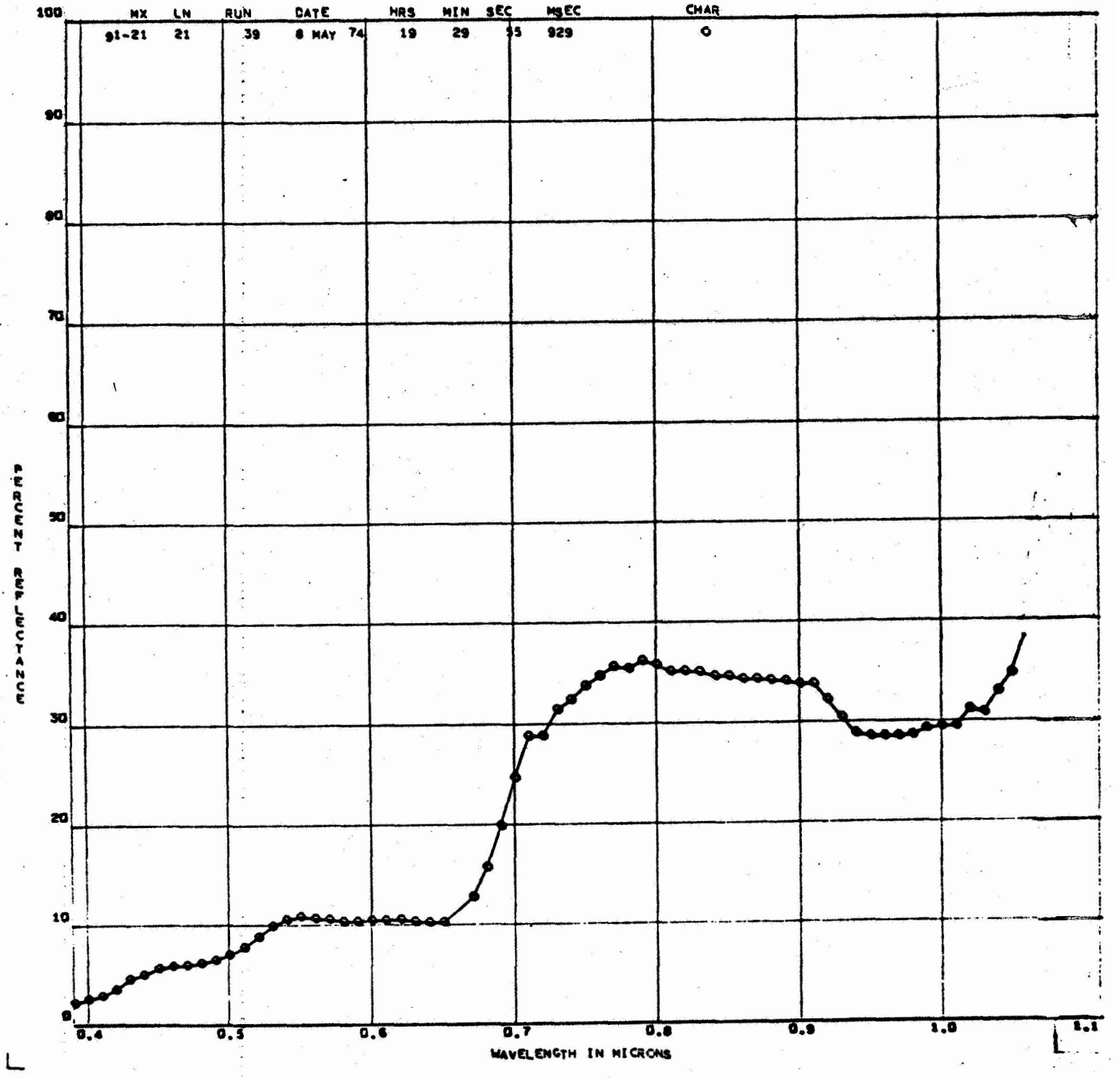
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 21

BANANA SQUASH

SPECTROMETER SIGNATURE



PLOT NO. 22 POTATO

CROP HISTORY

Feb 22, 1974	Irrigated
Mar 8, 1974	Rain, planted
Mar 12, 1974	Harrowed
Mar 27, 1974	Emerging
Mar 29, 1974	80 - 90% stand
Apr 8, 1974	Weeded
Apr 12, 1974	Irrigated
Apr 23, 1974	Weeded
Apr 25, 1974	Irrigated
May 1, 1974	Furrows cultivated

PLOT NO. 22

POTATO

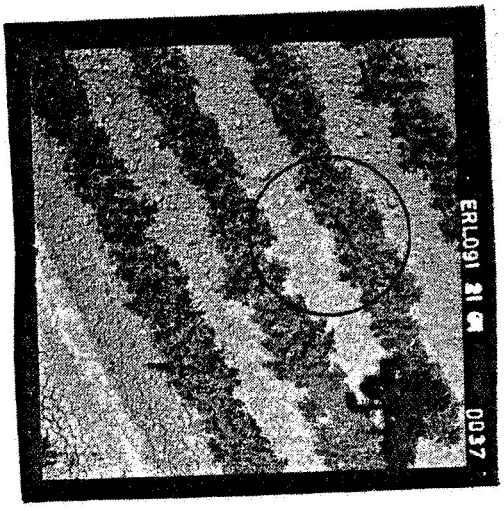
GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Apr 11, 1974	4	12	Dry	Normal	-
Apr 18, 1974	10	15	Moist	Normal	-
Apr 27, 1974	14	25	Moist	Normal	-
May 1, 1974	14	31	Moist 1" down	Normal	A few small whit blossoms
May 8, 1974	17	42	Moist	Healthy	Starting to blossom

PLOT NO. 22 POTATO

MAY 8, 1974

GROUND LEVEL



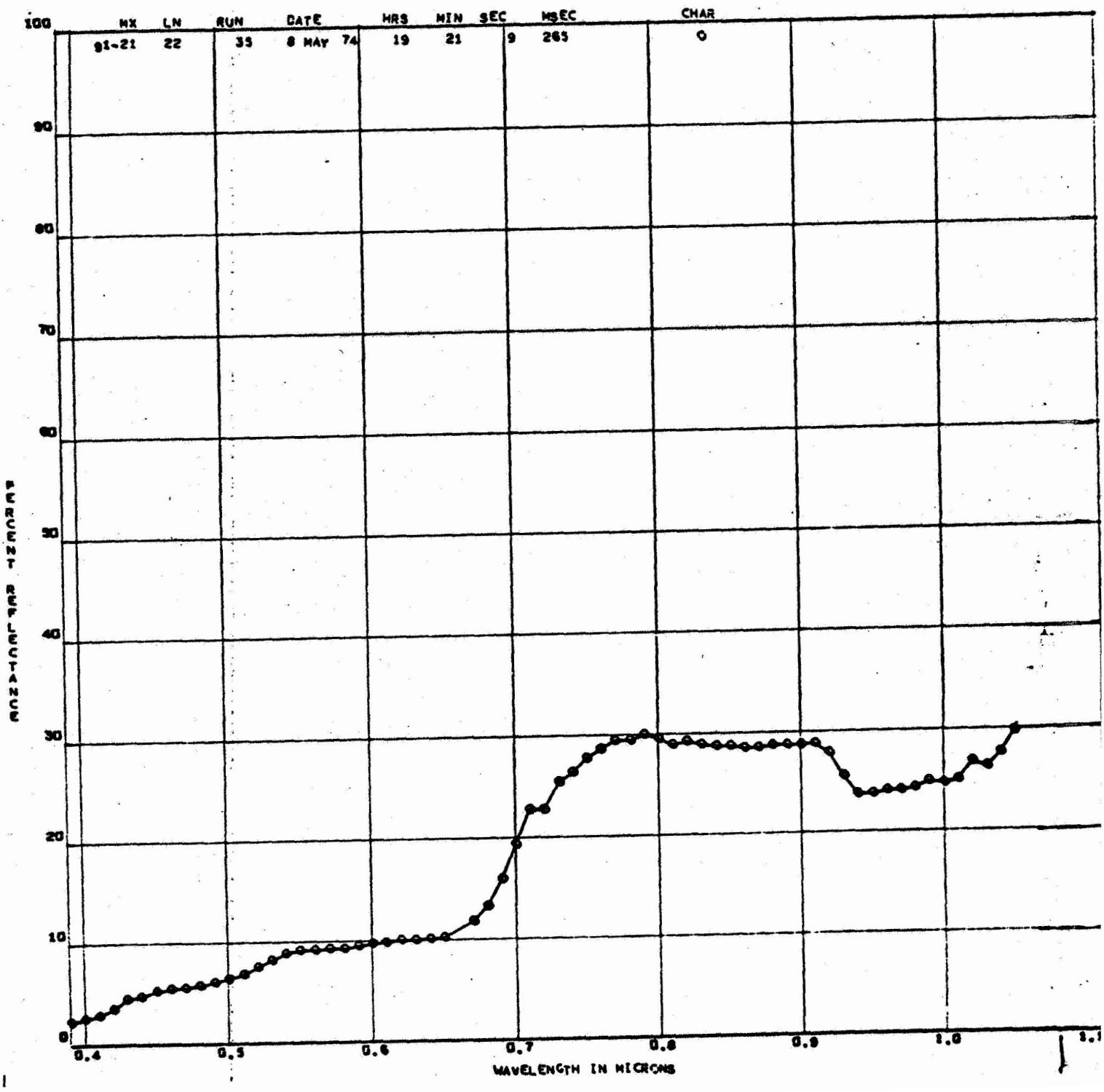
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 22

POTATO

SPECTROMETER SIGNATURE



PLOT NO. 23 **CABBAGE**

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing
Nov 9, 1973	Irrigated
Nov 12, 1973	First emergence
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 12"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 21, 1974	Irrigated
Apr 12, 1974	Hoed weeds, irrigated
Apr 23, 1974	Weeded

PLOT NO. 23

CABBAGE

GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973	1	1	Moist 1" down	Wilted	Thinned Dec 17 1973
Jan 3, 1974	3-4	2	Moist 1.5" down	Normal	-
Jan 10, 1974	5	17	Moist .5" down	Normal	-
Jan 14, 1974	5	20	Wet	Normal	-
Jan 25, 1974	5	17	Moist 3" down	Normal	Salt on rows - Jan 21, 1974
Jan 30, 1974	5	15	Moist 2" down	Normal	-
Feb 7, 1974	6	20	Dry	Normal	No weeds
Feb 14, 1974	7	20	Dry	Normal	-
Feb 22, 1974	7	22	.. -	Normal	-
Feb 28, 1974	7.25	23	-	Normal	-
Mar 8, 1974	8	25	Moist	Normal	-
Mar 13, 1974	9	27	Moist	Normal	-
Mar 20, 1974	9.5	28	Dry	Normal	-
Mar 27, 1974	11	30	Dry	Normal	Forming heads
Apr 3, 1974	11	30	Dry	Normal	-
Apr 11, 1974	11	30	Dry	Normal	Heads mostly fille base leaves yellowing
Apr 18, 1974	9	35	Dry	Yellowing	Mostly heads

PLOT NO. 24

BROCCOLI

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing
Nov 9, 1973	Irrigated
Nov 12, 1973	First emergence
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 14"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 21, 1974	Irrigated
Apr 11, 1974	Harvested
Apr 23, 1974	Weeded

PLOT NO. 24

BROCCOLI

GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973	1	1	Moist 1" down	Wilted	Thinned Dec 17
Jan 3, 1974	3	1	Moist 1.5" down	Normal	-
Jan 10, 1974	5	15	Moist 1.5" down	Normal	-
Jan 14, 1974	6	18	Wet	Normal	-
Jan 25, 1974	5	17	Moist 3" down	Normal	Tens.= 3 5% weeds - salt on rows Jan 21, 1974
Jan 30, 1974	7	17	Moist 2" down	Normal	-
Feb 7, 1974	8	20	Dry	Normal	No weeds, Tens. = 30
Feb 14, 1974	9	25	Dry	Normal	-
Feb 22, 1974	10	27	-	Normal	Tens. = 61 on Feb 11, 66 Feb 13, 67 Feb 15, 12 Feb 20
Feb 28, 1974	12	36	-	Normal	-
Mar 8, 1974	12	40	Moist	Normal	-
Mar 13, 1974	21	55	Moist	Normal	Tens. = 38 on Feb 28, 61 Mar 4, 67 Mar 6, 27 Mar 13, 39 Mar 15
Mar 20, 1974	21	60	Dry	Normal	Beginning to head
Mar 27, 1974	27	80	Dry	Normal	6 plants with yellow blossoms Tens. = 68 on Mar 19, 76 Mar 21
Apr 3, 1974	27	90	Dry	Normal	25 plants with yellow blossoms
Apr 11, 1974	24	50	Dry	Harvested	-

PLOT NO. 25 ONIONS

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 4 rows on 40" beds with 4-8-4" spacing
Nov 9, 1973	Irrigated
Nov 21, 1973	Irrigated
Nov 26, 1973	First emergence
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Hand weeded - Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 21, 1974	Irrigated
Apr 12, 1974	Hoed weeds, irrigated
Apr 23, 1974	Weeded

PLOT NO. 25 ONIONS

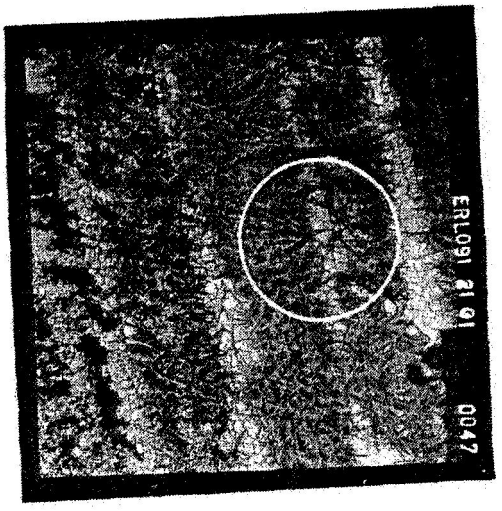
GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973	1	3	Moist 1" down	Sprouts emerging	-
Jan 3, 1974	2-3	4	Moist 1.5" down	Normal	-
Jan 10, 1974	3	15	Moist .5" down	Normal	5% weeds
Jan 14, 1974	4	8	Wet	Normal	Thinned and weeded - Jan 14, 1974
Jan 25, 1974	6	8	Moist 3" down	Normal	Salt on rows Jan 21, 1974
Jan 30, 1974	7	10	Moist 2" down	Normal	-
Feb 7, 1974	7	10	Dry	Normal	No weeds
Feb 14, 1974	9	12	Dry	Normal	-
Feb 22, 1974	9.5	14	-	Normal	-
Feb 28, 1974	9.5	20	-	Normal	-
Mar 8, 1974	11	20	Moist	Normal	-
Mar 13, 1974	14	23	Moist	Normal	-
Mar 20, 1974	16	25	Dry	Normal	-
Mar 27, 1974	19	30	Dry	Normal	-
Apr 3, 1974	21	35	Dry	Normal	50% with stem bent over
Apr 11, 1974	21	40	Dry	Normal	Leaves bent over at measured height
Apr 18, 1974	24	55	Dry	Normal	-
Apr 27, 1974	29	60	Dry	Normal	-
May 1, 1974	27	70	Dry	Normal	-
May 8, 1974	32	75	Dry	Normal	-

PLOT NO. 25 ONIONS

MAY 8, 1974

GROUND LEVEL



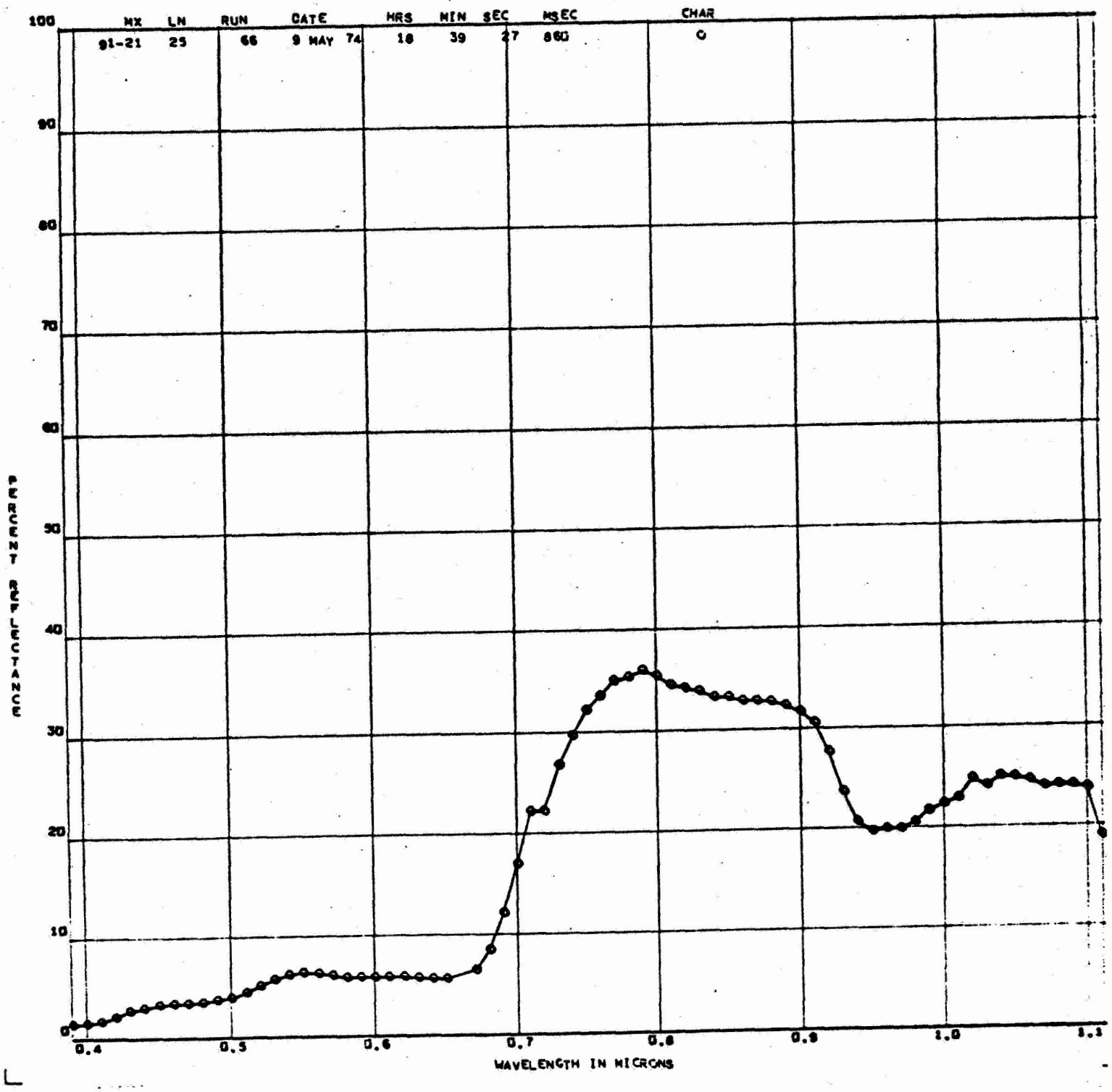
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 25

ONIONS

SPECTROMETER SIGNATURE



PLOT NO. 26

POPPY-1
(Acquisition No. B-40-6-3 .)

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing and 9" spacing in drill
Nov 9, 1973	Irrigated
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 9"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 21, 1974	Irrigated
Apr 12, 1974	Hoed weeds
Apr 23, 1974	Weeded

PLOT NO. 26

POPPY-1
(Acquisition No. B-40-6-3)

GROUND TRUTH DATA

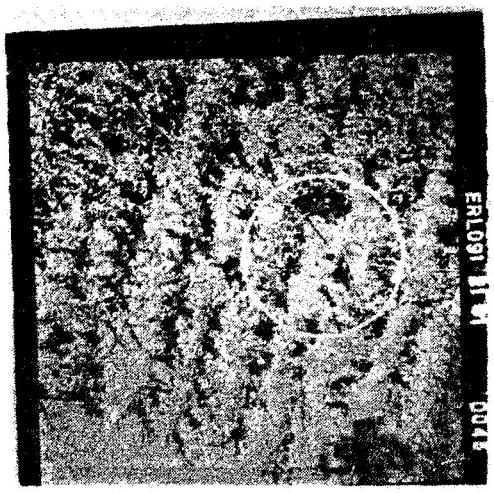
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973	1	1	Moist 1" down	Wilted	Thinned Dec 17
Jan 3, 1974	1-1.5	4	Moist 1.5" down	Normal	-
Jan 10, 1974	2	12	Moist .5" down	Normal	-
Jan 14, 1974	3	22	Wet	Normal	-
Jan 25, 1974	4	15	Moist 3" down	Normal	Tens. = 11 salt on rows - Jan 21, 1974
Jan 30, 1974	6	18	Moist 2" down	Normal	-
Feb 7, 1974	8	30	Dry	Normal	No weeds, tens. = 50
Feb 14, 1974	11	35	Dry	Normal	-
Feb 22, 1974	13.5	40	-	Normal	Tens. = 80 on Feb 11, 84 Feb 13, 79 Feb 15, 10 Feb 20
Feb 28, 1974	16	59	-	Normal	-
Mar 8, 1974	23	65	Moist	Normal	-
Mar 13, 1974	34	75	Moist	Normal	Tens. = 37 on Feb 28, 59 Mar 4, 69 Mar 6, 20 Mar 13, 31 Mar 15
Mar 20, 1974	40	85	Dry	Normal	-
Mar 27, 1974	55	97	Dry	Normal	60% with blossoms Tens. = 64 on Mar 19, 71 Mar 21
Apr 3, 1974	65	97	Dry	Normal	20% of plants laying over, 20% with blossoms
Apr 11, 1974	50	100	Dry	Leaves yellowing, post blossom	Windblown at data point
Apr 18, 1974	55	97	Dry	Yellowing post blossom	-
Apr 27, 1974	52	90	Dry	Yellow	Dry, windblown
May 1, 1974	52	90	Dry	Dried up, yellow	-
May 8, 1974	52	90	Dry	Dry	-

PLOT NO. 26

POPPY-1
(Acquisition No. B-40-6-3)

MAY 8, 1974

GROUND LEVEL



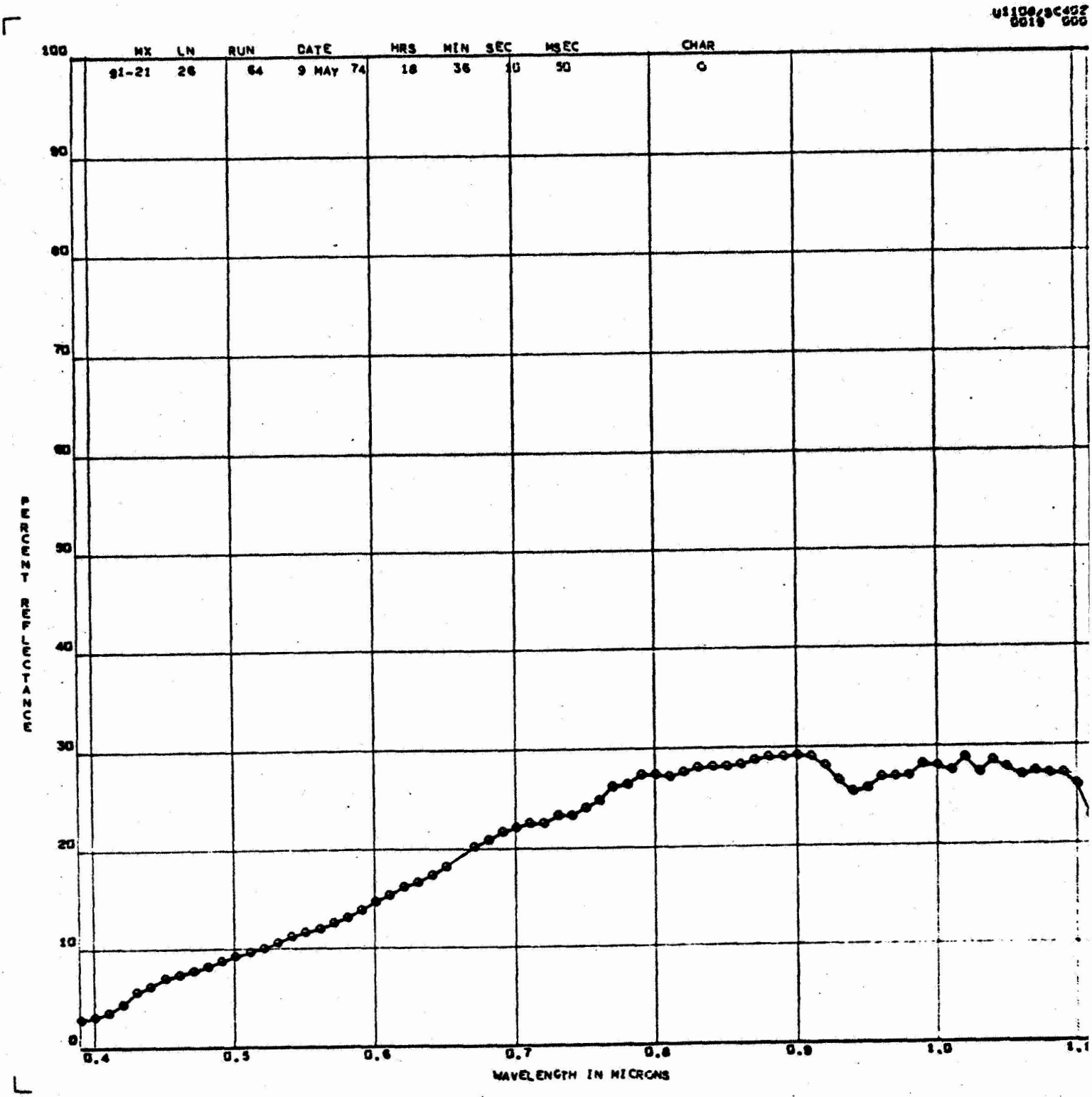
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 26

POPPY-1

SPECTROMETER SIGNATURE



PLOT NO. 27

POPPY- 3
(Acquisition No. 371923 - .)

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing and 9" spacing in drill
Nov 9, 1973	Irrigated
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 9"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 21, 1974	Irrigated
Apr 12, 1974	Hoed weeds
Apr 23, 1974	Weeded

PLOT NO. 27

POPPY-3
(Acquisition No. 371923)

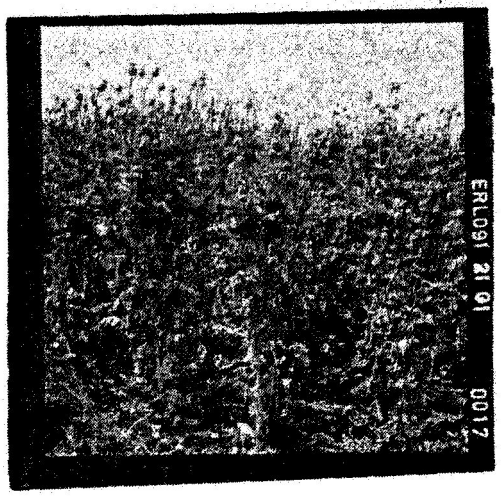
GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973	1	1	Moist 1" down	Wilted	Thinned Dec 17
Jan 3, 1974	1	2	-	Normal	-
Jan 10, 1974	2	12	Moist .5" down	Normal	Few weeds
Jan 14, 1974	3	22	Wet	Normal	-
Jan 25, 1974	4	20	Moist 3" down	Normal	1% weeds, salt on rows - Jan 21, 197
Jan 30, 1974	4	15	Moist 2" down	Normal	-
Feb 7, 1974	5	25	Dry	Normal	No weeds
Feb 14, 1974	6	25	Dry	Normal	-
Feb 22, 1974	8.5	35	-	Normal	-
Feb 28, 1974	12	59	-	Normal	Two blossoms
Mar 8, 1974	19	65	Moist	Normal	Several blossoms and buds
Mar 13, 1974	29	70	Moist	Normal	Many red blossoms
Mar 20, 1974	34	80	Dry	Normal	-
Mar 27, 1974	51	95	Dry	Normal	40% with blossoms
Apr 3, 1974	52	97	Dry	Normal	30% with blossoms
Apr 11, 1974	52	97	Dry	Normal	Few blossoms hanging on
Apr 18, 1974	55	97	Dry	Yellowing, 95% post blossom	-
Apr 27, 1974	56	95	Dry	Drying	A few flowers
May 1, 1974	52	95	Dry	Drying	A few flowers
May 8, 1974	52	95	Dry	Drying	Few blossoms

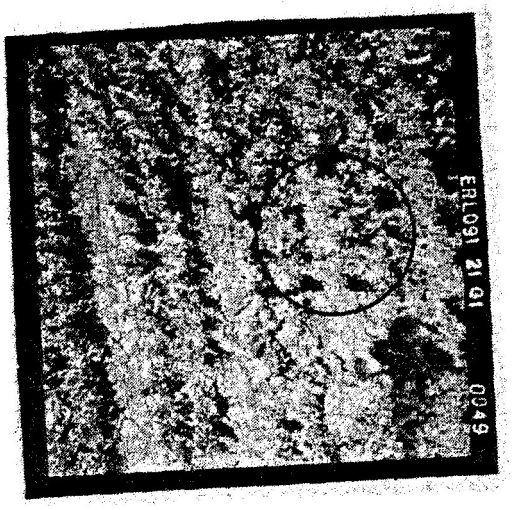
PLOT NO. 27

POPPY-3
(Acquisition No. 371923)

MAY 8, 1974



GROUND LEVEL



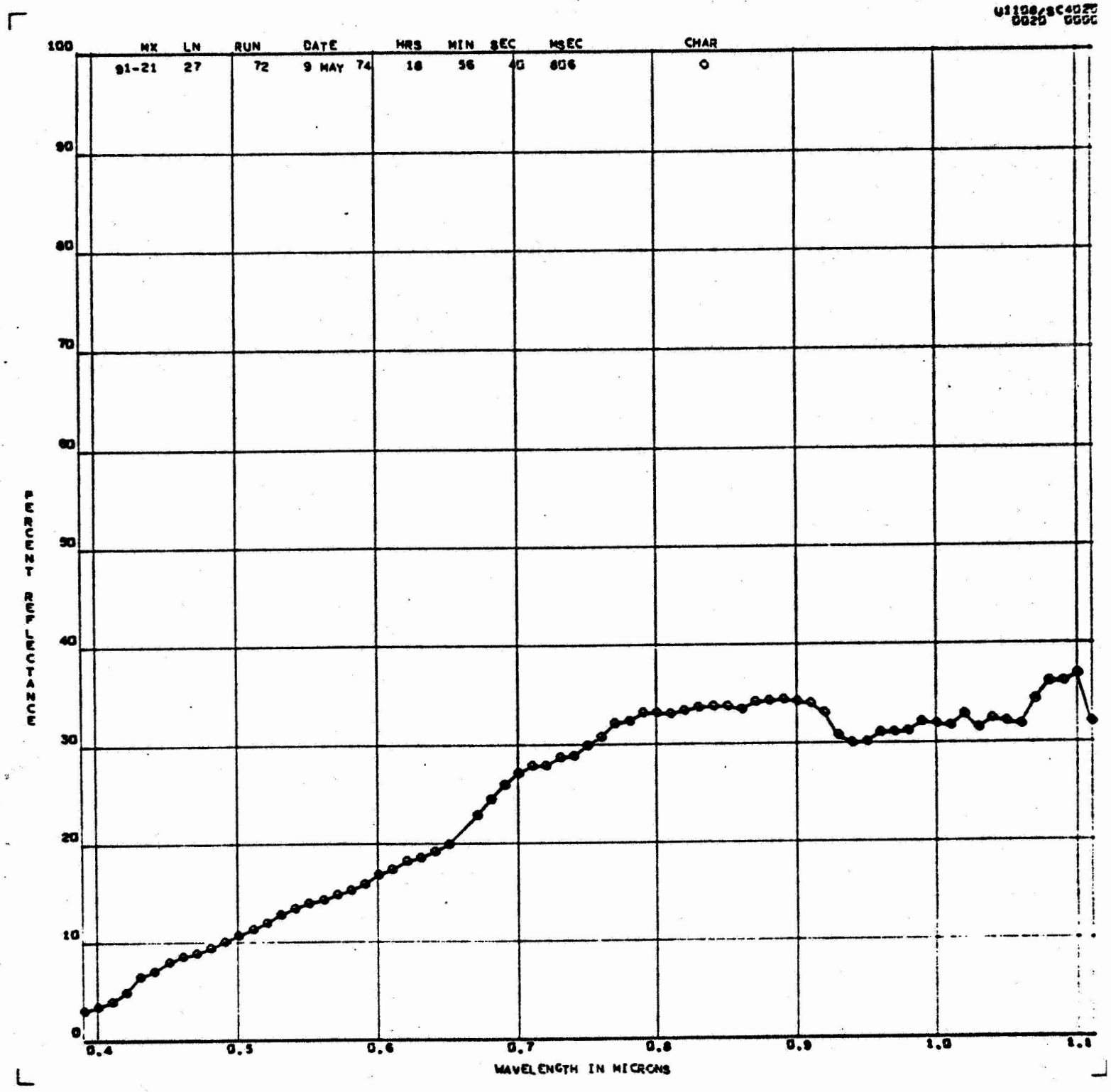
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 27

POPPY-3

SPECTROMETER SIGNATURE



PLOT NO. 29 PINTO BEANS

CROP HISTORY

Feb 22, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain, planted
Mar 20, 1974	Beginning to surface
Apr 8, 1974	Weeded
Apr 12, 1974	Irrigated
Apr 23, 1974	Weeded

PLOT NO. 29

PINTO BEANS

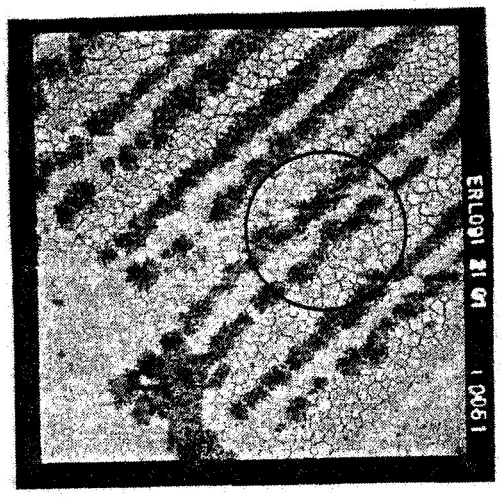
GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Apr 11, 1974	4	16	Dry	Normal	-
Apr 18, 1974	6	16	Dry	Normal	Weeds in furrow
Apr 27, 1974	7	19	Dry	Normal	Tens. = 41 on Apr 24
May 1, 1974	10	18	Dry	Leaves look sunburned	Small, white flowers
May 8, 1974	10	23	Dry	Yellow cast	Blossoms

PLOT NO. 29 PINTO BEANS

MAY 8, 1974

GROUND LEVEL



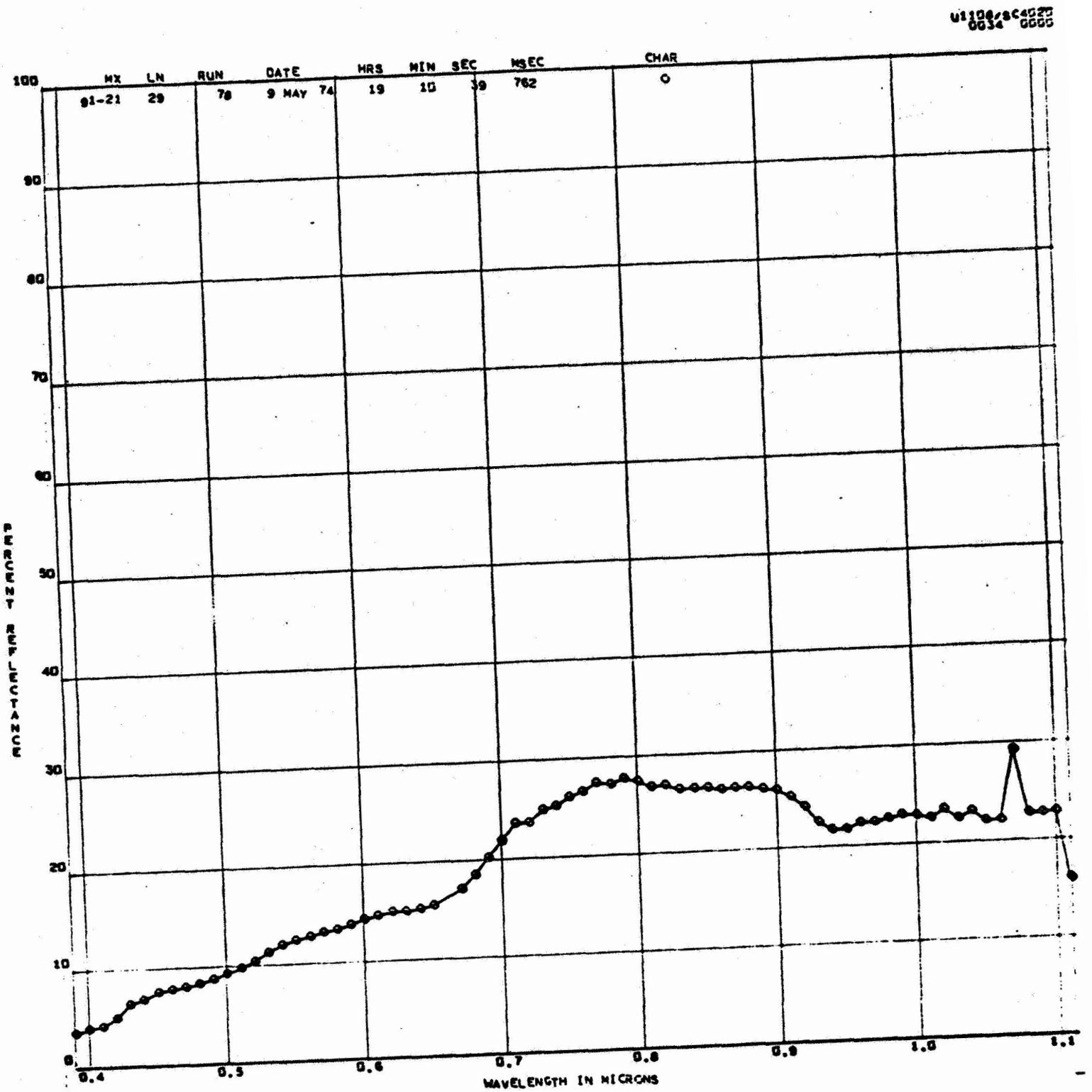
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 29

PINTO BEANS

SPECTROMETER SIGNATURE



PLOT NO. 30 - CHILI PEPPER

CROP HISTORY

Feb 22, 1974	Irrigated
Feb 22, 1974	Planted
Mar 8, 1974	Rain
Mar 20, 1974	Beginning to surface
Apr 8, 1974	Weeded
Apr 23, 1974	Weeded

PLOT NO. 30

CHILI, PEPPER

GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Apr 11, 1974	-	-	Dry	-	Trace of plant color

PLOT NO. 31 SOYBEANS

CROP HISTORY

Feb 22, 1974	Irrigated
Mar 8, 1974	Rain, planted
Mar 20, 1974	Beginning to surface
Apr 8, 1974	Weeded
Apr 23, 1974	Weeded

PLOT NO. 31

SOYBEANS

GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Apr 11, 1974	4.5	18	Dry	Normal	-
Apr 18, 1974	7	18	Dry	Normal	-
Apr 27, 1974	14	30	Dry	Normal	-
May 1, 1974	14	40	Dry	Normal	-
May 8, 1974	16.5	50	Dry	Normal	-

PLOT NO. 31

SOYBEANS

MAY 8, 1974

GROUND LEVEL

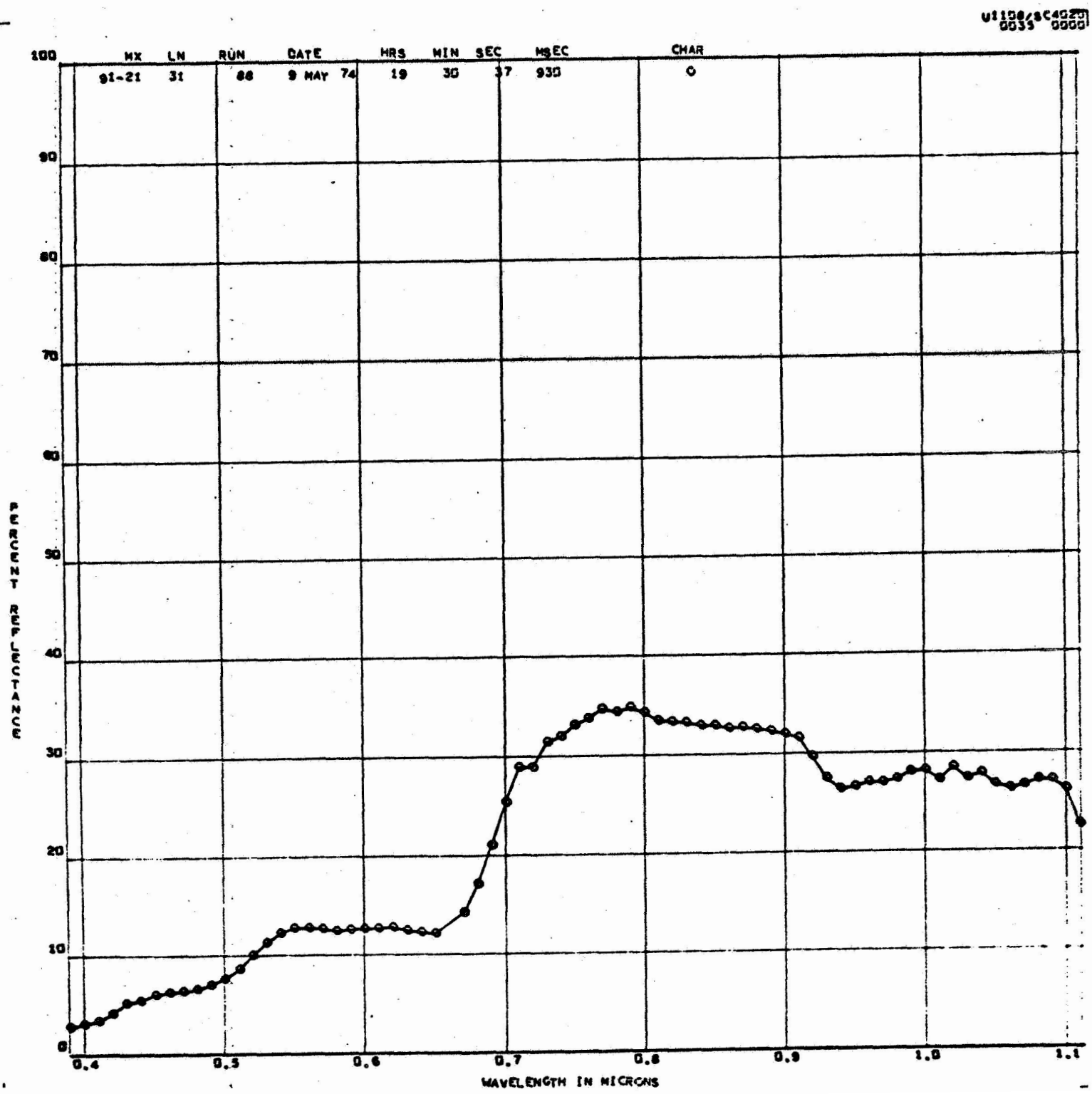
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 31

SOYBEANS

SPECTROMETER SIGNATURE



PLOT NO. 32 ZUCCHINI

CROP HISTORY

Feb 22, 1974	Irrigated
Feb 22, 1974	Planted
Mar 8, 1974	Rain
Mar 15, 1974	Thinned
Apr 8, 1974	Weeded
Apr 12, 1974	Irrigated
Apr 23, 1974	Weeded

PLOT NO. 32 ZUCCHINI

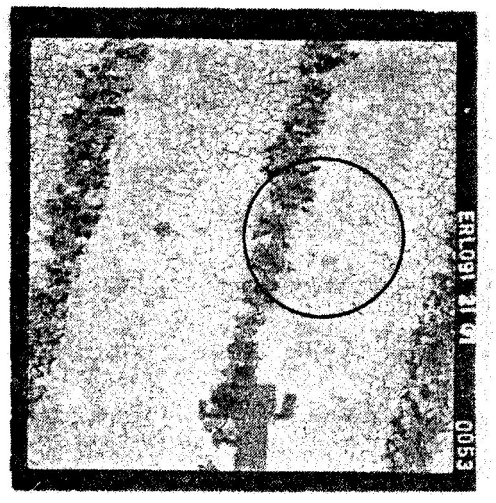
GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Apr 11, 1974	9.5	12	Dry	Normal	-
Apr 18, 1974	9	15	Dry	Normal	Starting to bloom
Apr 27, 1974	9	15	Dry	Normal	-
May 1, 1974	12	18	Dry	Normal	Yellow flowers and fruit
May 8, 1974	14	20	Dry	Normal	Blossoms and fruit

PLOT NO. 32 ZUCCHINI

MAY 8, 1974

GROUND LEVEL



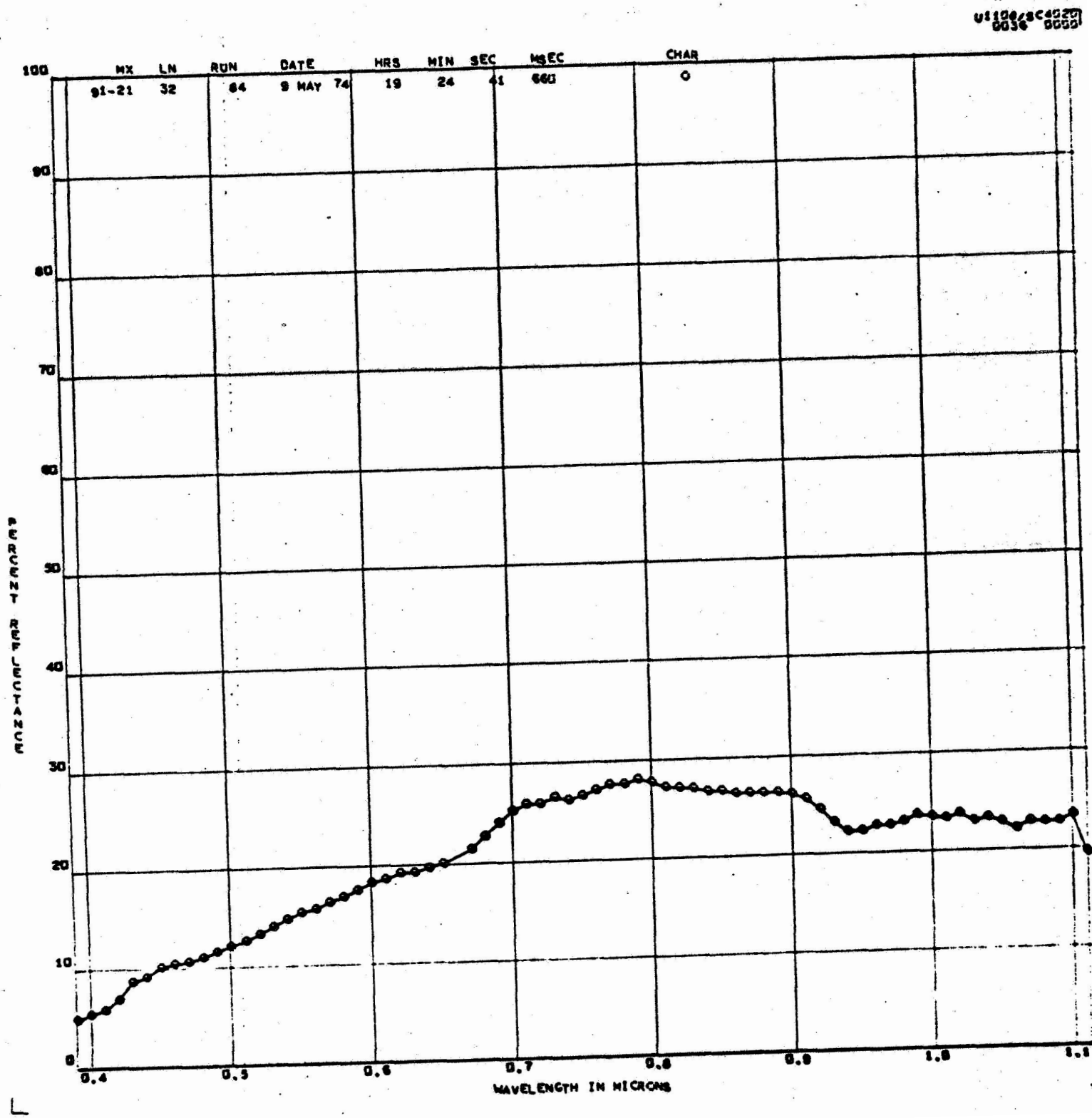
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 32

ZUCCHINI

SPECTROMETER SIGNATURE



PLOT NO. 3A

CAULIFLOWER

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing and 24" spacing in drill
Nov 9, 1973	Irrigated
Nov 13, 1973	First emergence
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 24"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 11, 1974	Sprayed with phosdrin
Mar 21, 1974	Irrigated
Apr 12, 1974	Hoed weeds
Apr 23, 1974	Weeded

PLOT NO. 34 - CAULIFLOWER

GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973	1	1	Moist 1" down	Wilted	Thinned Dec 17
Jan 3, 1974	2	2	Moist 1.5" down	Normal	-
Jan 10, 1974	6	12	Moist .5" down	Normal	-
Jan 14, 1974	6.5	15	Wet	Normal	-
Jan 25, 1974	8	20	Moist 3" down	Normal	2% weeds - salt on rows, Jan 21, 1974
Jan 30, 1974	9	20	Moist 2" down	Normal	-
Feb 7, 1974	12	30	Dry	Normal	No weeds
Feb 14, 1974	14	31	Dry	Normal	-
Feb 22, 1974	14	31	-	Normal	-
Feb 28, 1974	17	34	-	Normal	-
Mar 8, 1974	19	38	Moist	Normal	-
Mar 13, 1974	20	43	Moist	Normal	-
Mar 20, 1974	23	50	Dry	Normal	-
Mar 27, 1974	24.5	75	Dry	Normal	25% with leaves that have shriv edges
Apr 3, 1974	26	85	Dry	Normal	6 plants with white heads, 25 leaf curl due t insects
Apr 11, 1974	26	90	Dry	Normal	Few plants gone to flower, soma leaf curl
Apr 18, 1974	27	95	Dry	Sunburned	Many heads
Apr 27, 1974	6	60	Dry	Post-harvest	Stubble

PLOT NO. 35 CARROT

CROP HISTORY

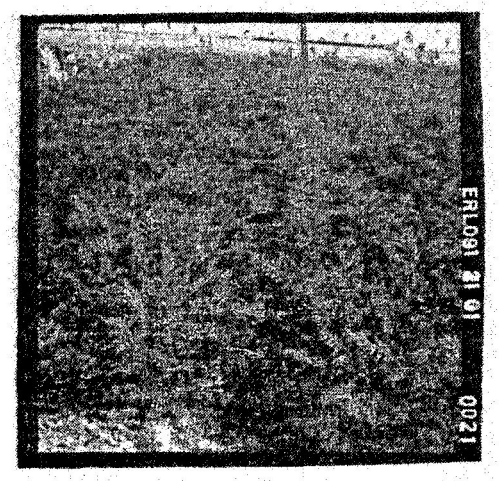
Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 4 rows on 40" beds with 4-8-4" spacing
Nov 9, 1973	Irrigated
Nov 21, 1973	Irrigated
Nov 26, 1973	First emergence
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated - Sprayed with Lorax
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 21, 1974	Irrigated
Apr 12, 1974	Hoed weeds, irrigated
Apr 23, 1974	Weeded

PLOT NO. 35 CARROT

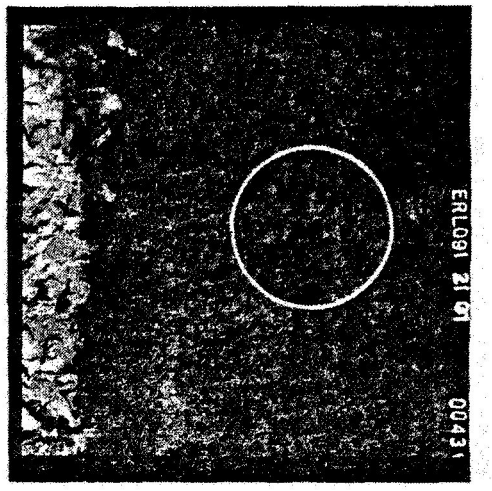
GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973	1	1	Moist 1" down	Sprouts emerged	-
Jan 3, 1974	-	-	Moist 1" down	-	-
Jan 10, 1974	2	30	Moist .5" down	Normal	10% weeds
Jan 14, 1974	2	20	Wet	Normal	7% weeds
Jan 25, 1974	4	33	Moist 3" down	Normal	3% weeds, tens. = 8 salt on rows Jan 21, 1974
Jan 30, 1974	4	30	Moist 2" down	Normal	-
Feb 7, 1974	4	33	Dry	Normal	No weeds, tens. = 50
Feb 14, 1974	5	33	Dry	Normal	-
Feb 22, 1974	5	33	-	Normal	Tens. = 59 on Feb 11, 62 Feb 13, 79 Feb 15, 10 Feb 20
Feb 28, 1974	6.5	46	-	Normal	-
Mar 8, 1974	10	50	Moist	Normal	-
Mar 13, 1974	11	55	Moist	Normal	Tens. = 32 on Feb 28, 48 Mar 4, 45 Mar 6, 12 Mar 13, 22 Mar 15
Mar 20, 1974	13	60	Dry	Normal	-
Mar 27, 1974	15	95	Dry	Normal	Several plants have yellow leave: Ten. = 40 on Mar 19, 45 Mar 21,
Apr 3, 1974	18	97	Dry	Normal	-
Apr 11, 1974	18.5	100	Dry	Normal	-
Apr 18, 1974	19	100	Dry	Normal	-
Apr 27, 1974	18	100	Dry	Normal	Beginning to mature
May 1, 1974	17	100	Dry	Normal	Going to seed
May 8, 1974	21	100	Dry	Going to seed	-

PLOT NO. 35 CARROT



GROUND LEVEL



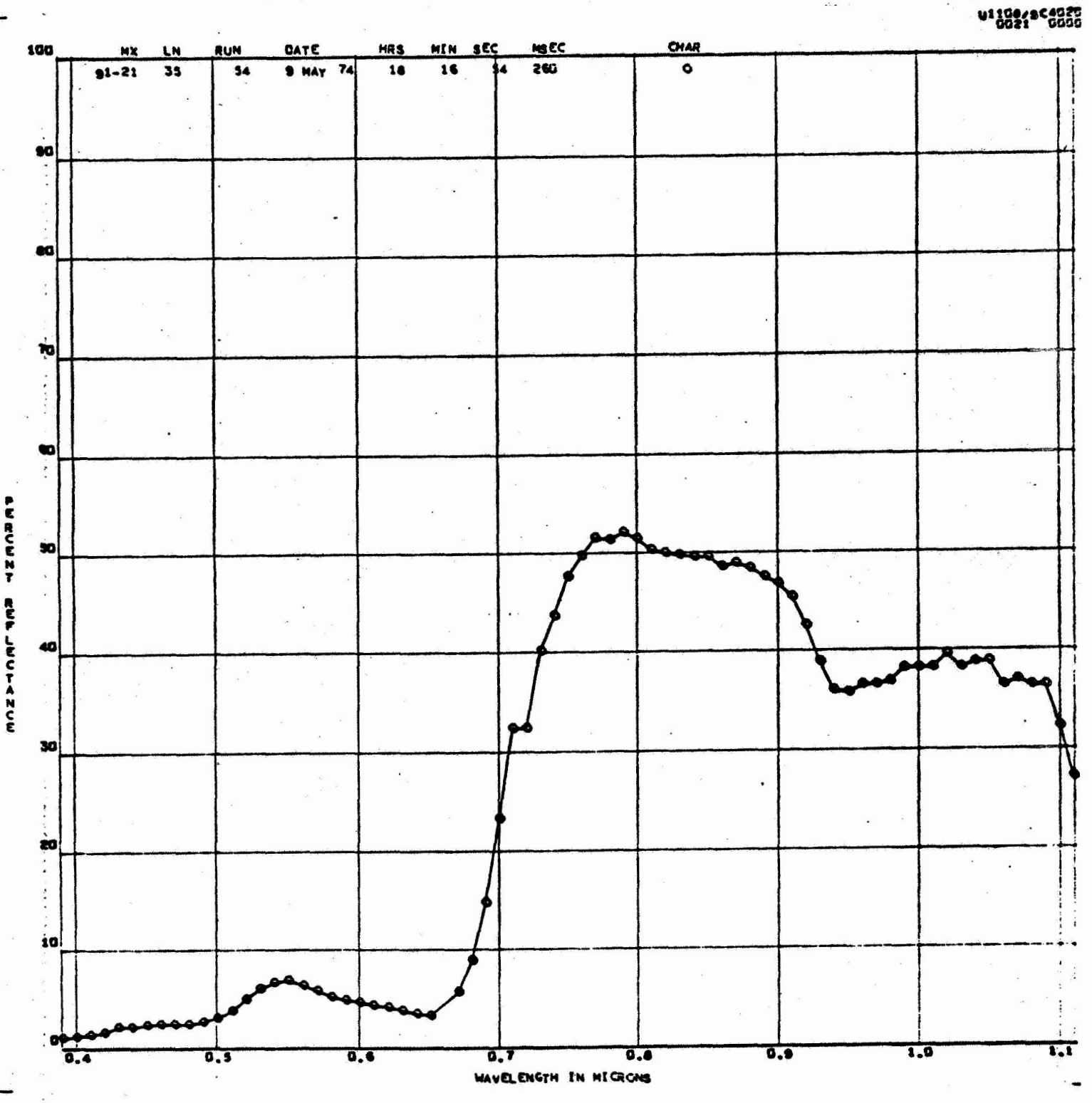
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 35

CARROT

SPECTROMETER SIGNATURE



PLOT NO. 36 CHICK PEAS

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Dec 4, 1973	Planted 2 rows on 40" beds with 12" spacing
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 26, 1973	First emergence
Jan 7, 1974	Poor stand
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Transplanted for proper stand - Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 21, 1974	Irrigated
Apr 12, 1974	Hoed weeds, irrigated
Apr 23, 1974	Weeded
May 3, 1974	Undercut

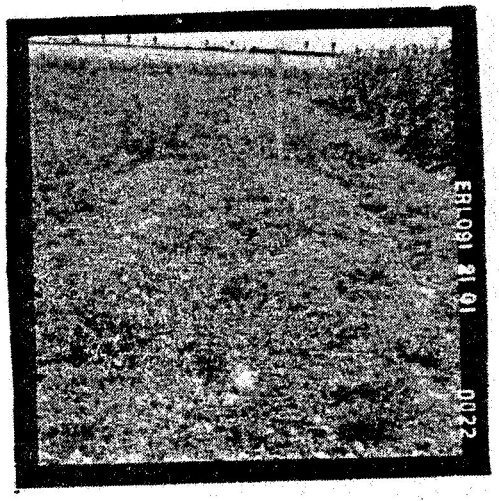
PLOT NO. 36 CHICK PEAS

GROUND TRUTH DATA

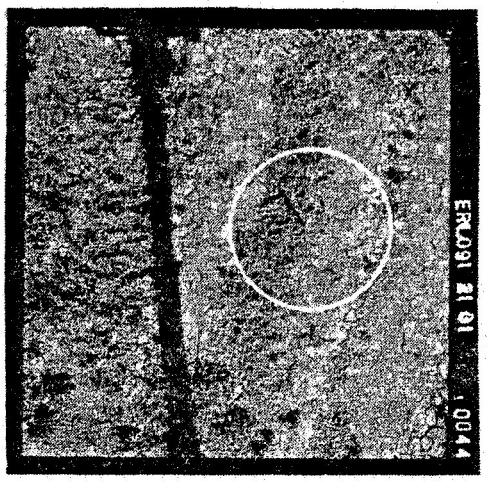
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973	-	-	Moist 1" down	-	Not emerged
Jan 3, 1974	1	1	Moist 1.5" down	Normal	-
Jan 10, 1974	2.5	3	Moist .5" down	Normal	Poor stand
Jan 14, 1974	4	6	Wet	Normal	Transplanted for good stand
Jan 25, 1974	6	8	Moist 3" down	Normal	Salt on rows Jan 21, 1974
Jan 30, 1974	6	7	Moist 2" down	Normal	-
Feb 7, 1974	7	20	Dry	Normal	No weeds
Feb 14, 1974	9	20	Dry	Normal	Poor stand
Feb 22, 1974	11	21	-	Normal	Small white bloss
Feb 28, 1974	11	23	-	Normal	Small white bloss
Mar 8, 1974	14	30	Moist	Normal	Small white bloss
Mar 13, 1974	14	40	Moist	Normal	Small white bloss and pods
Mar 20, 1974	15	60	Dry	Normal	-
Mar 27, 1974	15	65	Dry	Normal	-
Apr 3, 1974	17.5	80	Dry	Normal	30% of plants wit yellowing leaves
Apr 11, 1974	17.5	80	Dry	50% of plants yellowing	-
Apr 18, 1974	16	75	Dry	Yellowing	20% weeds
Apr 27, 1974	14	70	Dry	Mature, yellow	-
May 1, 1974	14	70	Dry	Dry, yellow	-
May 8, 1974	-	50	Dry	Ready for harvest	Undercut, laying on ground

PLOT NO. 36 CHICK PEAS

MAY 8, 1974



GROUND LEVEL



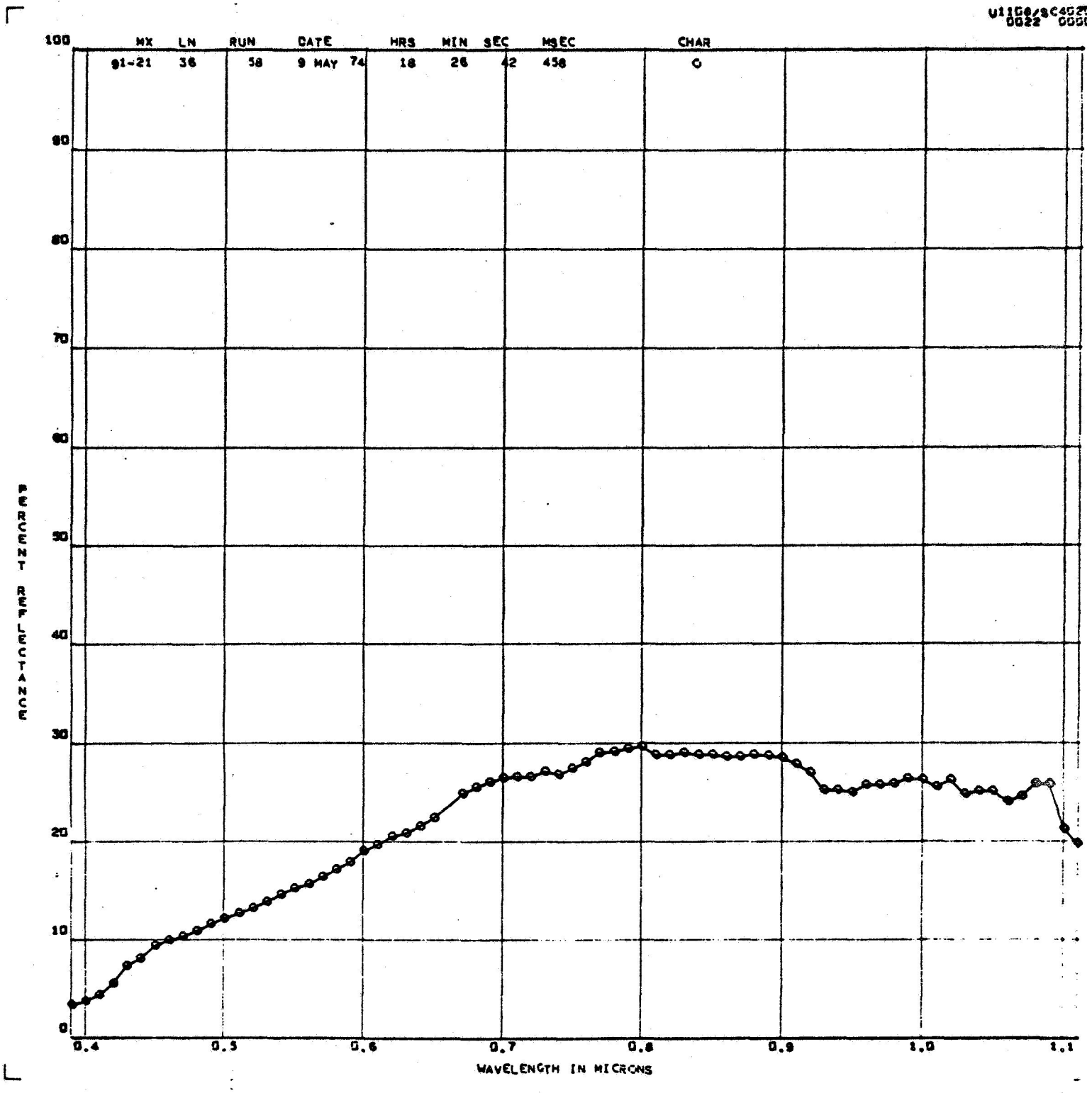
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 36

CHICK PEAS

SPECTROMETER SIGNATURE



PLOT NO. 37

POPPY-2
(Acquisition No. M-89)

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted rows on 40" beds with 12" spacing and 9" spacing in drill
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 9"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 21, 1974	Irrigated
Apr 12, 1974	Hoed weeds
Apr 23, 1974	Weeded

PLOT NO. 37

- POPPY-2
(Acquisition No. M-89)

GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973	1	1	Moist 1" down	Wilted	Thinned Dec 19
Jan 3, 1974	1.5	2	Moist 1.5" down	Normal	-
Jan 10, 1974	2	10	Moist .5" down	Normal	-
Jan 14, 1974	3	22	Wet	Normal	-
Jan 25, 1974	4	15	Moist 3" down	Normal	5% weeds, salt on rows - Jan 2: 1974
Jan 30, 1974	6	15	Moist 2" down	Normal	-
Feb 7, 1974	7	30	Dry	Normal	No weeds
Feb 14, 1974	9	33	Dry	Normal	-
Feb 22, 1974	10	46	-	Normal	-
Feb 28, 1974	14	52	-	Normal	-
Mar 8, 1974	18	60	Moist	Normal	-
Mar 13, 1974	30	85	Moist	Normal	-
Mar 20, 1974	39	88	Dry	Normal	White blossoms
Mar 27, 1974	55	97	Dry	Normal	50% with blosson
Apr 3, 1974	55	97	Dry	Normal	Plants laying ov at data point, 3(with blossoms
Apr 11, 1974	50	97	Dry	Post-blossom	Windblown at data point
Apr 18, 1974	55	97	Dry	Yellowing, post-blossom	Windblown
Apr 27, 1974	55	90	Dry	Yellow, dry	-
May 1, 1974	52	90	Dry	Yellow, dry	-
May 8, 1974	52	90	Dry	Dry	-

PLOT NO. 37

POPPY-2
(Acquisition No. M-89)

MAY 8, 1974

GROUND LEVEL

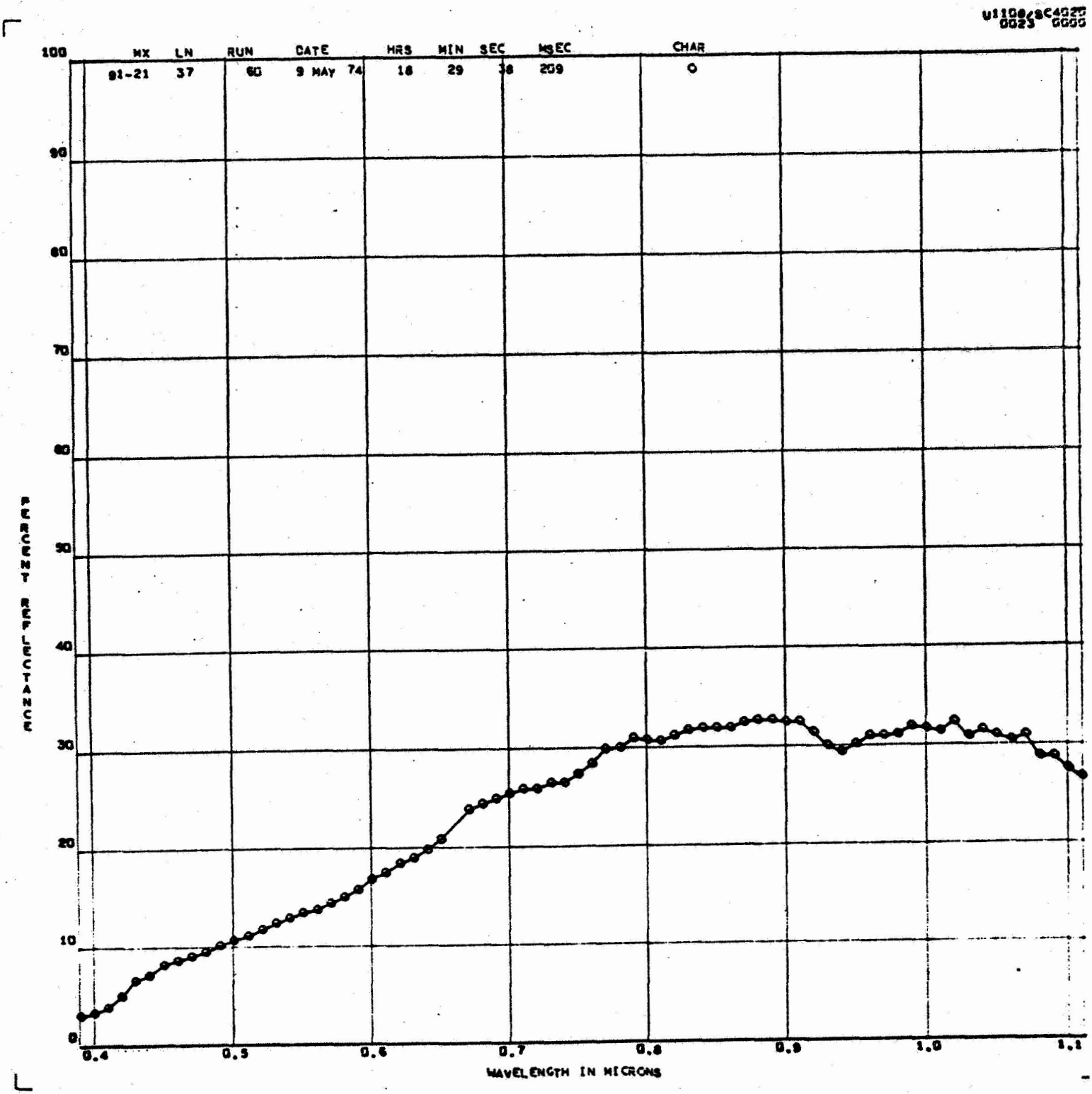
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 37

POPPY-2

SPECTROMETER SIGNATURE



PLOT NO. 38

POPPY-4
(Mixture of 1, 2, 3,)

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 7, 1973	Planted 2 rows on 40" beds with 12" spacing and 9" spacing in drill
Nov 9, 1973	Irrigated
Nov 13, 1973	First emergence
Nov 15, 1973	Up to a stand
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 17, 1973	Thinned to 9"
Dec 26, 1973	Cultivated
Jan 11, 1974	Sidedressed with 50 lbs N/Ac
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Mar 7, 1974	Irrigated
Mar 8, 1974	Rain
Mar 11, 1974	Sprayed with phosdrin
Mar 21, 1974	Irrigated
Apr 12, 1974	Hoed weeds
Apr 23, 1974	Weeded

PLOT NO. 38

POPPY-4
(Mixture of 1, 2,3,)

GROUND TRUTH DATA

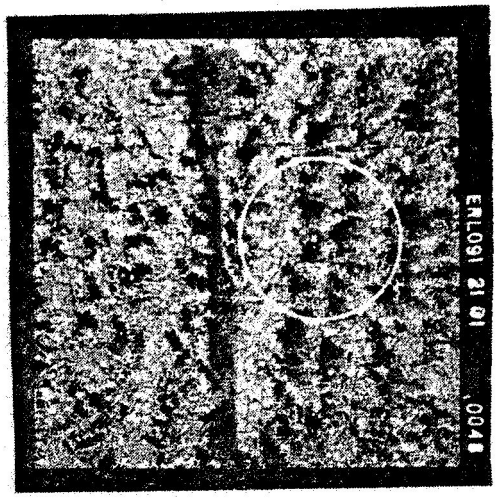
DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973	1	1	Moist 1" down	Wilted	Thinned Dec 17
Jan 3, 1974	1.5	3	Moist 1.5" down	Normal	-
Jan 10, 1974	2	10	Moist .5" down	Normal	-
Jan 14, 1974	2.5	20	Wet	Wet	-
Jan 25, 1974	4	20	Moist 3" down	Normal	2% weeds, salt on rows - Jan 21 1974
Jan 30, 1974	6	18	Moist 2" down	Normal	-
Feb 7, 1974	7	30	Dry	Normal	No weeds
Feb 14, 1974	10	33	Dry	Normal	-
Feb 22, 1974	11	46	-	Normal	-
Feb 28, 1974	15	52	-	Normal	-
Mar 8, 1974	18	60	Moist	Normal	-
Mar 13, 1974	29	75	Moist	Normal	-
Mar 20, 1974	39	85	Dry	Normal	Blossoms red, white
Mar 27, 1974	55	97	Dry	Normal	50% with blossom
Apr 3, 1974	57	97	Dry	Normal	25% with blossom
Apr 11, 1974	52	95	Dry	Post-blossom	-
Apr 18, 1974	60	98	Dry	Yellowing 98% post - blossom	-
Apr 27, 1974	57	95	Dry	Yellow	Few flowers, mos plants are dry
May 1, 1974	55	95	Dry	Dry, yellow	Few flowers
May 8, 1974	55	95	Dry	Mostly dry	-

PLOT NO. 38

POPPY-4
(Mixture of 1, 2, 3,)

MAY 8, 1974

GROUND LEVEL



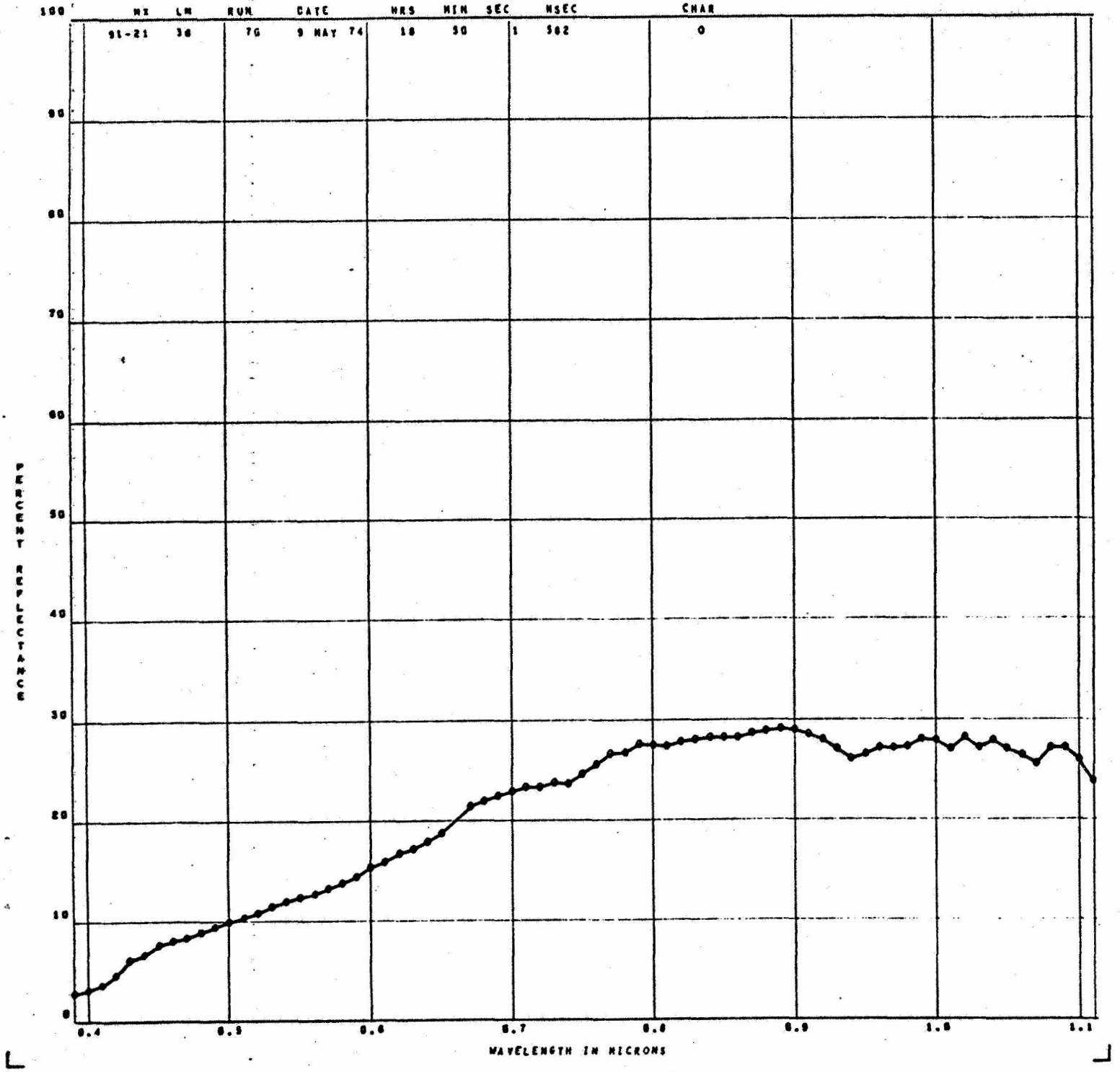
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 38

POPPY-4

SPECTROMETER SIGNATURE



PLOT NO. 39

BARE GROUND
(DRY)

CROP HISTORY

Nov 6, 1973	Fertilized with 50 lbs N/Ac
Nov 9, 1973	Irrigated
Dec 7, 1973	Fertilized with 50 lbs N/Ac - Irrigated
Dec 26, 1973	Cultivated
Jan 15, 1974	Irrigated
Jan 28, 1974	Hoed weeds
Jan 29, 1974	Disced fallow portion
Feb 14, 1974	Furrows cultivated
Feb 15, 1974	Irrigated
Mar 8, 1974	Rain
Mar 21, 1974	Irrigated
Apr 12, 1974	Hoed weeds
Apr 23, 1974	Weeded

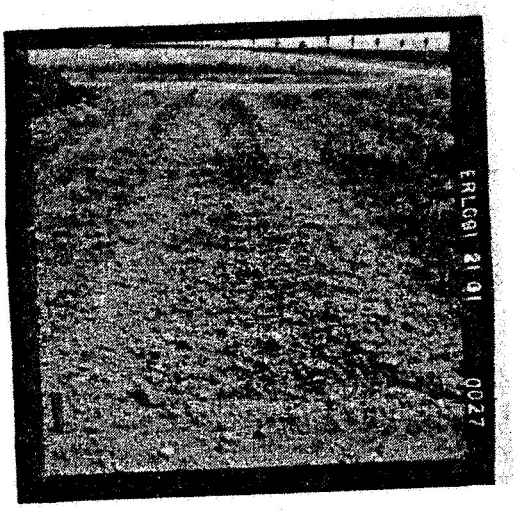
GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Dec 18, 1973	-	-	Moist 1" down	-	-
Jan 3, 1974	-	-	Dry	-	No weeds
Jan 10, 1974	-	0	Moist .5" down	-	-
Jan 14, 1974	-	0	Dry	-	Not irrigated or cultivated
Jan 25, 1974	-	0	Moist 3" down	-	No weeds, salt on rows - Jan 21 1974
Jan 30, 1974	-	-	Dry	-	-
Feb 7, 1974	-	-	-	-	No weeds
Feb 14, 1974	-	-	Dry	-	-
Feb 22, 1974	-	0	-	-	-
Feb 28, 1974	-	-	-	-	-
Mar 1, 1974	-	-	-	-	Plot relocated
Mar 13, 1974	-	-	Dry	-	-
Mar 20, 1974	-	-	Dry	-	-
Mar 27, 1974	-	-	Dry	-	-
Apr 3, 1974	-	-	Dry	-	-
Apr 11, 1974	-	-	-	-	-
Apr 18, 1974	-	-	Dry	-	-
Apr 27, 1974	-	-	Dry	-	-
May 1, 1974	-	-	Dry	-	-
May 8, 1974	-	-	Dry	-	-

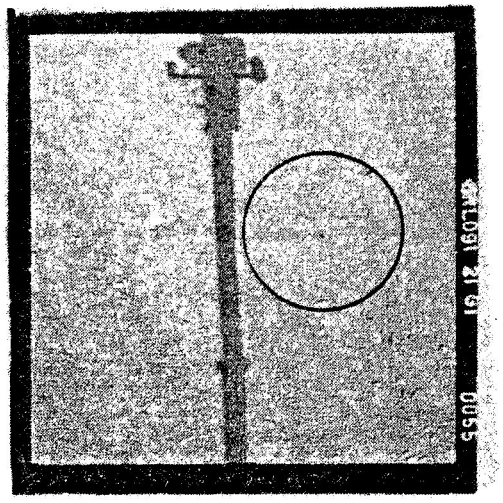
PLOT NO. 39

BARE GROUND
(DRY)

MAY 8, 1974



GROUND LEVEL



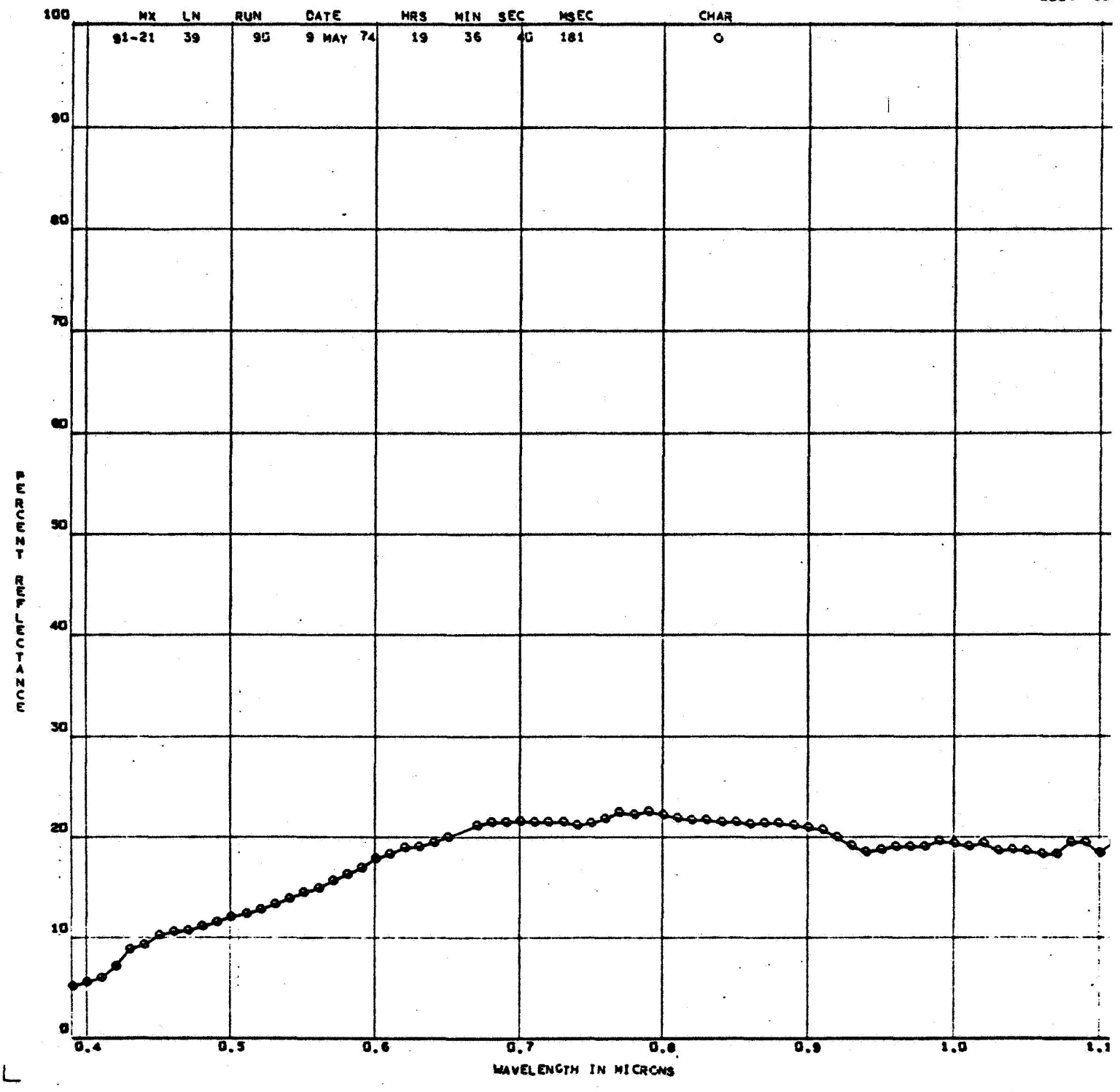
BORESIGHT

Circle represents spectrometer footprint

PLOT NO. 39

BARE GROUND
(DRY)

SPECTROMETER SIGNATURE



PLOT NO. 40 POPPY-5

CROP HISTORY

Feb 22, 1974	Irrigated
Feb 22, 1974	Rain, planted
Mar 20, 1974	Beginning to surface
Apr 8, 1974	Weeded
Apr 23, 1974	Weeded

PLOT NO. 40

POPPY-5

GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Apr 11, 1974	3	5	Dry	Normal	Weedy

PLOT NO. 41 TOMATO

CROP HISTORY

Feb 22, 1974	Irrigated
Feb 22, 1974	Planted
Mar 8, 1974	Rain
Mar 20, 1974	Beginning to surface
Apr 8, 1974	Weeded
Apr 23, 1974	Weeded

PLOT NO. 41 TOMATO

GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Apr 11, 1974	3	3	Dry	Normal	20% ground cover is weeds Tens. = 24 on Apr 24

PLOT NO. 42 SESAME

CROP HISTORY

Feb 22, 1974	Irrigated
Mar 8, 1974	Rain
Apr 11, 1974	Plot not planted yet
Apr 23, 1974	Weeded
Apr 25, 1974	Planted, irrigated

PLOT NO. 42

SESAME

GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Apr 11, 1974	-	-	-	-	No E-20 D data

PLOT NO. 43 BANANA SQUASH

CROP HISTORY

Feb 22, 1974	Irrigated
Feb 22, 1974	Planted
Mar 8, 1974	Rain
Mar 15, 1974	Thinned
Apr 8, 1974	Weeded
Apr 12, 1974	Irrigated
Apr 23, 1974	Weeded

PLOT NO. 45

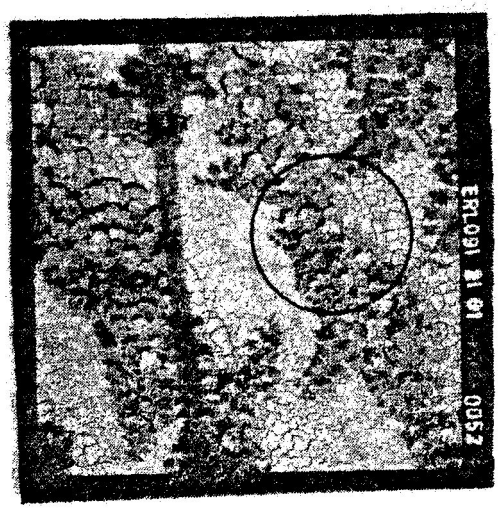
GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Apr 11, 1974	10	12	Dry	Normal	-
Apr 18, 1974	12	20	Dry	Normal	-
Apr 27, 1974	12	20	Dry	Normal	Yellow blossoms, beginning to frui Tens. = 28 on Apr 24
May 1, 1974	15	30	Dry	Normal	Yellow flowers, fruit
May 8, 1974	15	45	Dry	Normal	Blossoms, fruit

PLOT NO. 43 BANANA SQUASH

MAY 8, 1974

GROUND LEVEL

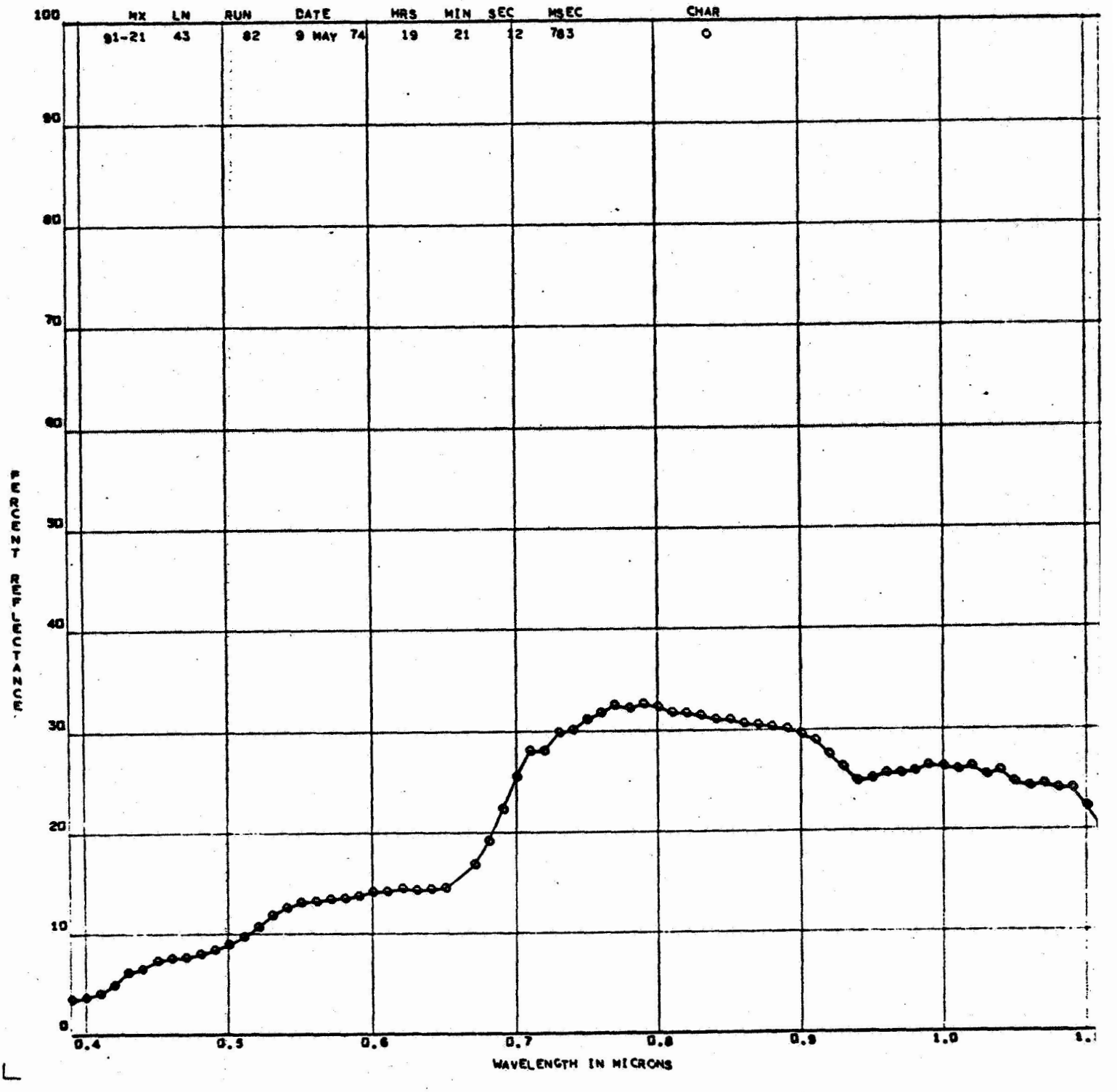


Circle represents spectrometer footprint

PLOT NO. 43

BANANA SQUASH

SPECTROMETER SIGNATURE



PLOT NO. 44 POTATO

CROP HISTORY

Feb 22, 1974	Irrigated
Mar 8, 1974	Rain, planted
Mar 12, 1974	Harrowed
Mar 27, 1974	Emerging
Mar 29, 1974	80-90% stand
Apr 8, 1974	Weeded
Apr 12, 1974	Irrigated
Apr 23, 1974	Weeded
May 1, 1974	Furrows cultivated

PLOT NO. 44

POTATO

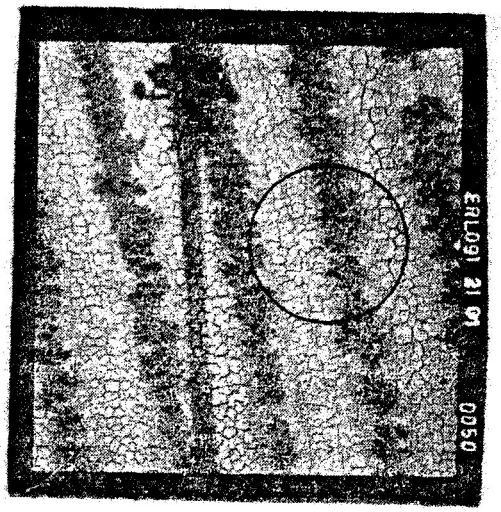
GROUND TRUTH DATA

DATE	CROP HEIGHT (inches)	GROUND COVER %	GROUND SURFACE CONDITIONS	CROP CONDITION	COMMENTS
Apr 11, 1974	5.5	10	Dry	Normal	-
Apr 18, 1974	8	15	Dry	Normal	-
Apr 27, 1974	12	20	Dry	Normal	-
May 1, 1974	10	21	Dry	Normal	-
May 8, 1974	13	24	Dry	Normal	Starting to blossom

PLOT NO. 44 POTATO

MAY 8, 1974

GROUND LEVEL



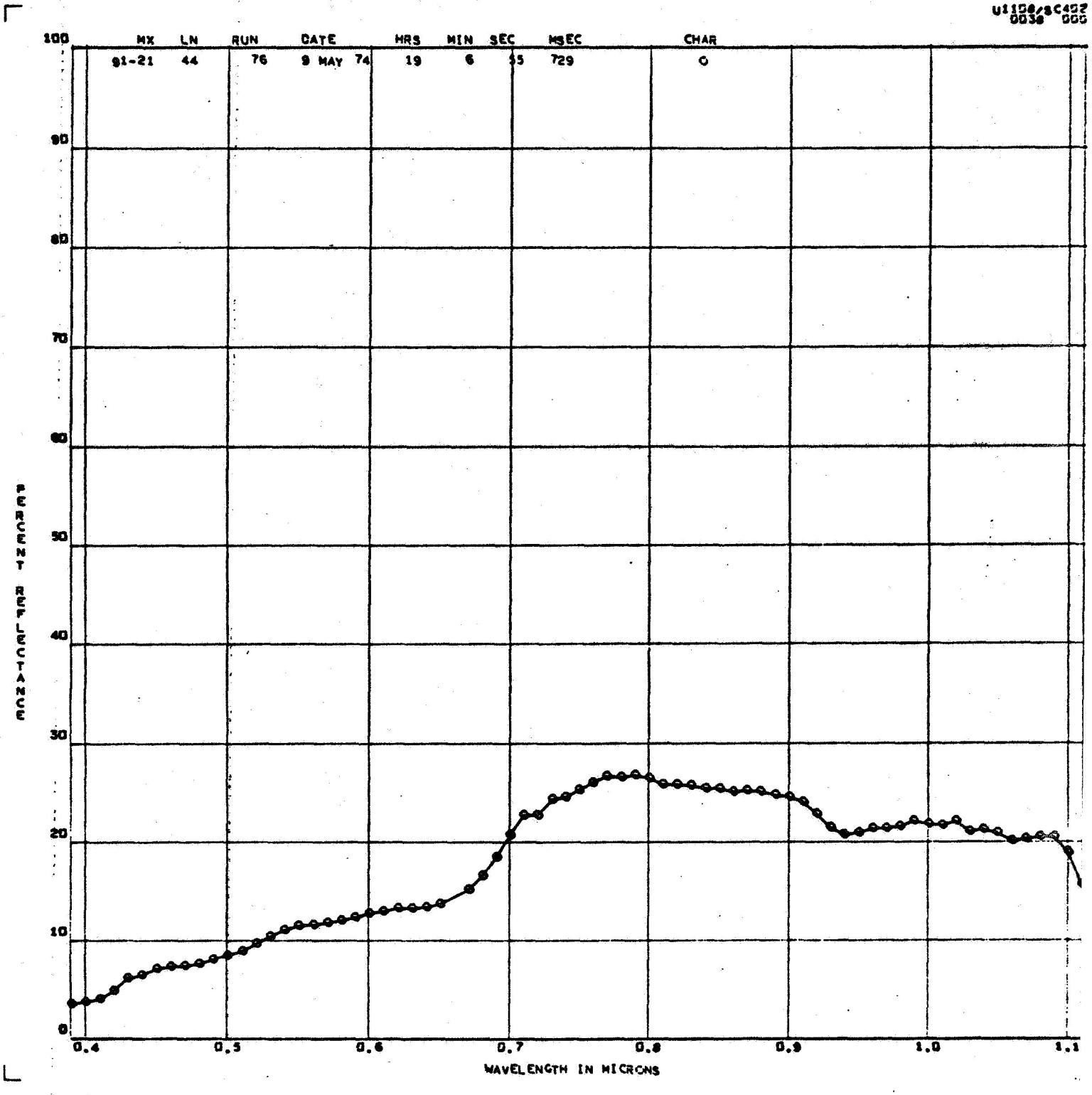
BORESIGHT

Circle represents spectrometer footprint

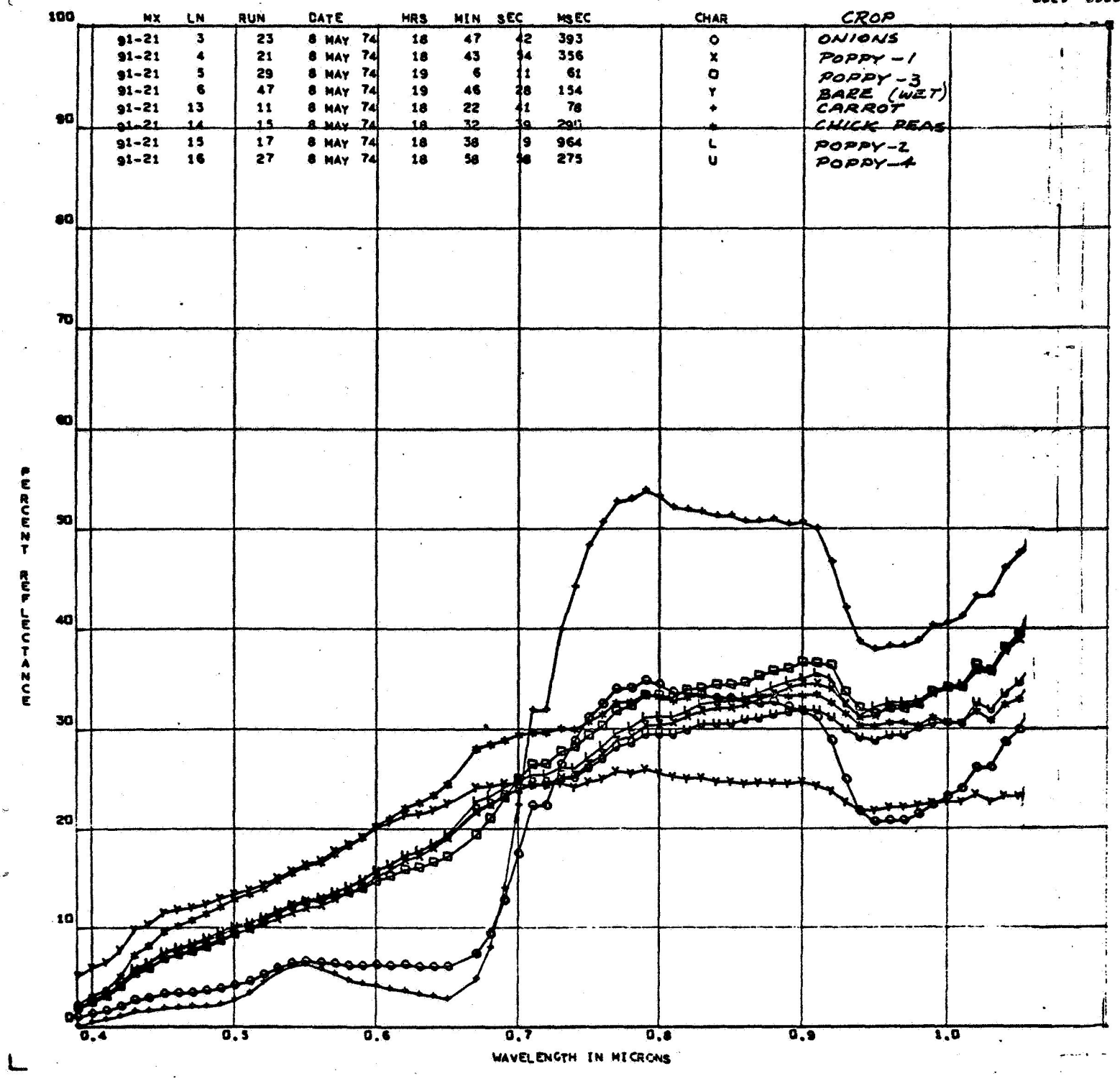
PLOT NO. 44

POTATO

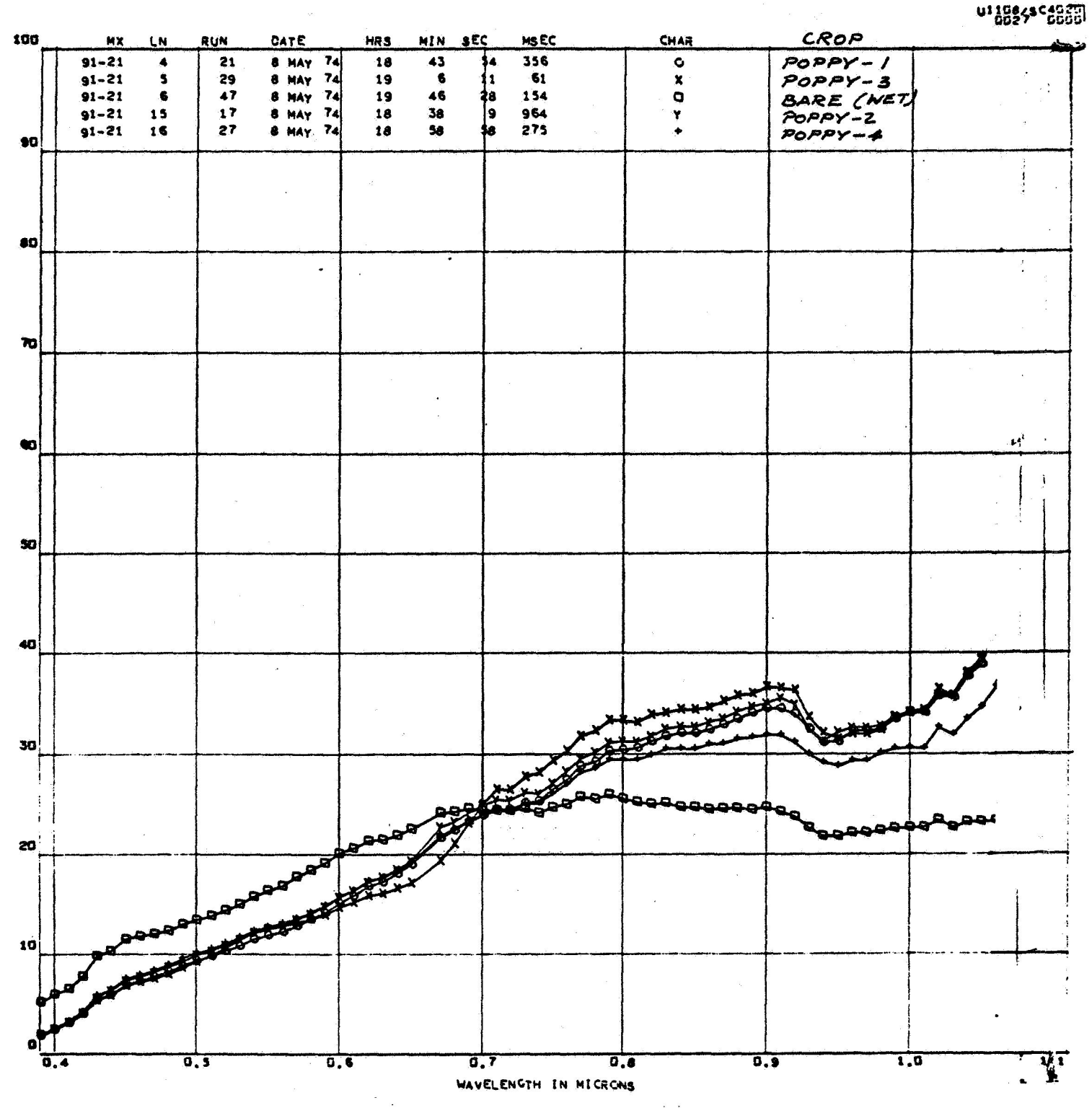
SPECTROMETER SIGNATURE



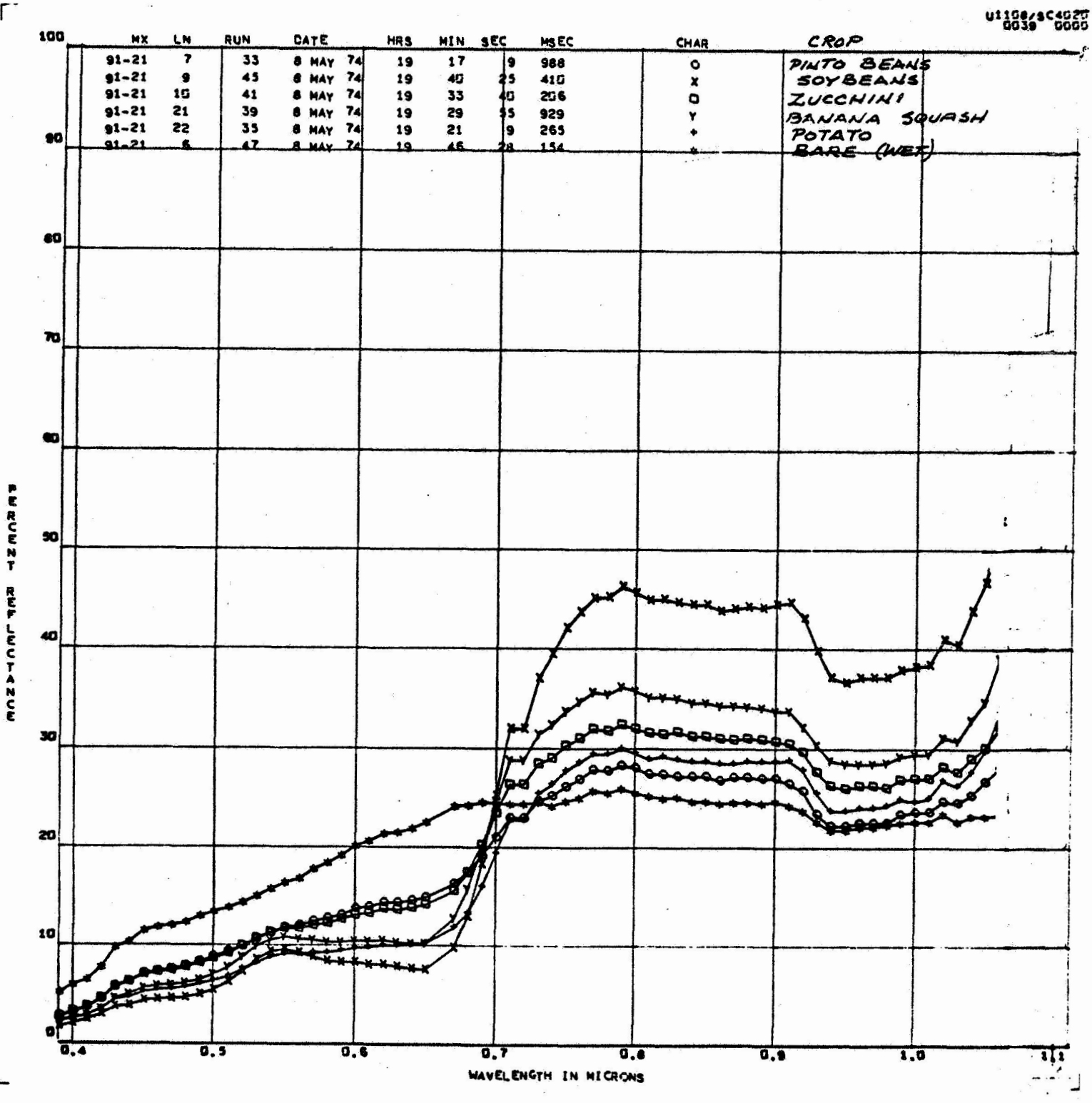
MULTIPLE SPECTROMETER CURVES



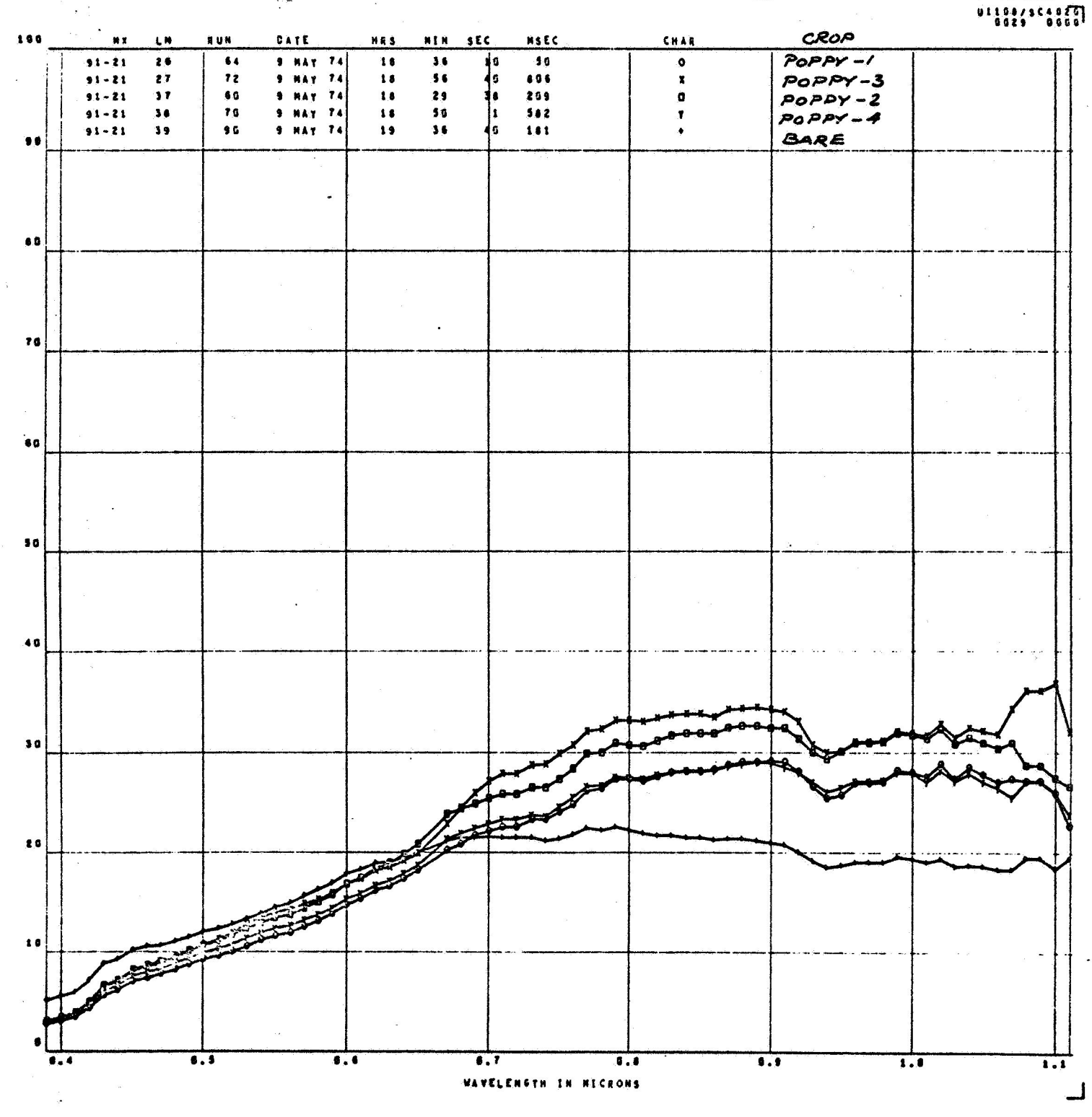
MULTIPLE SPECTROMETER CURVES



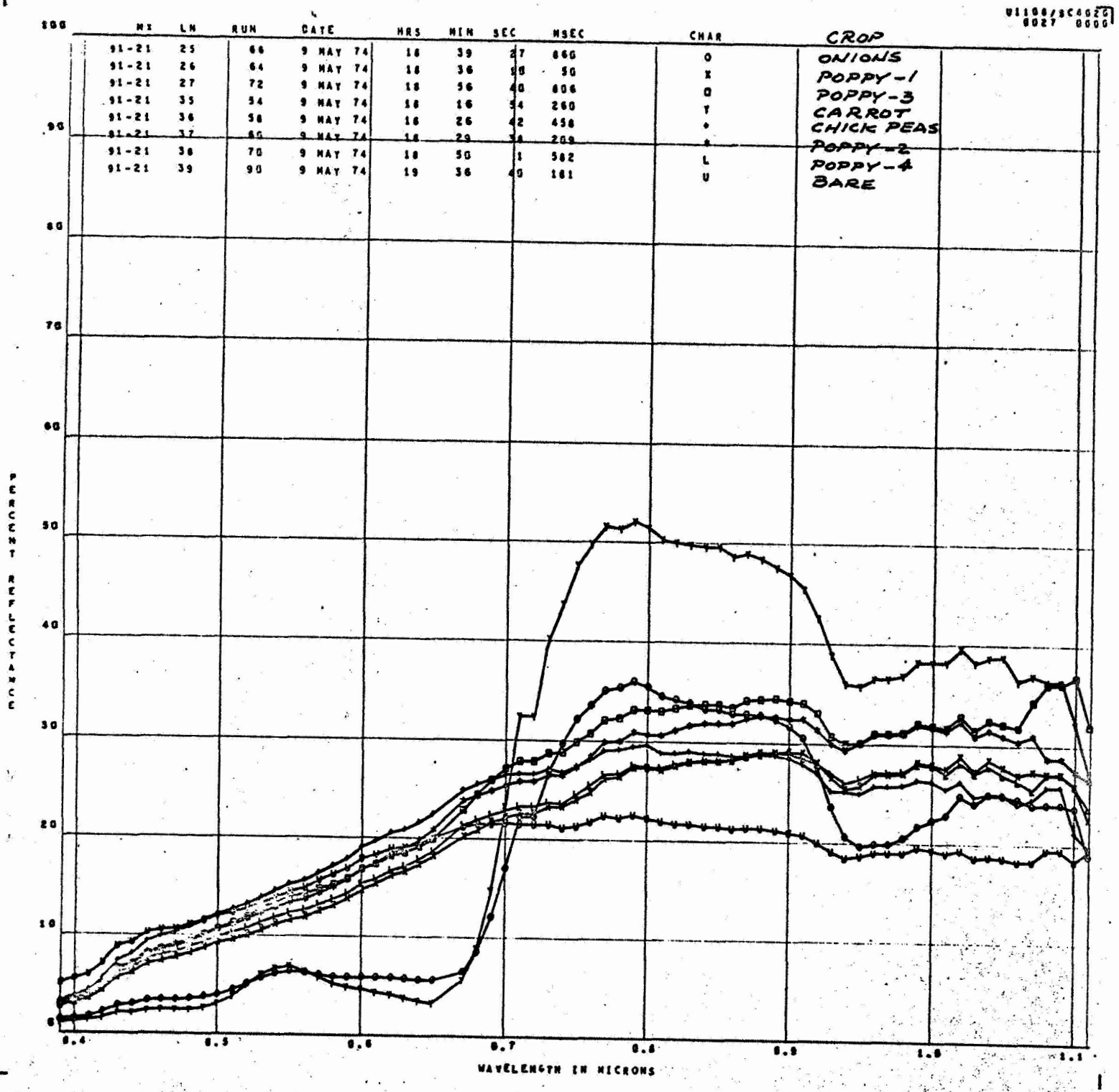
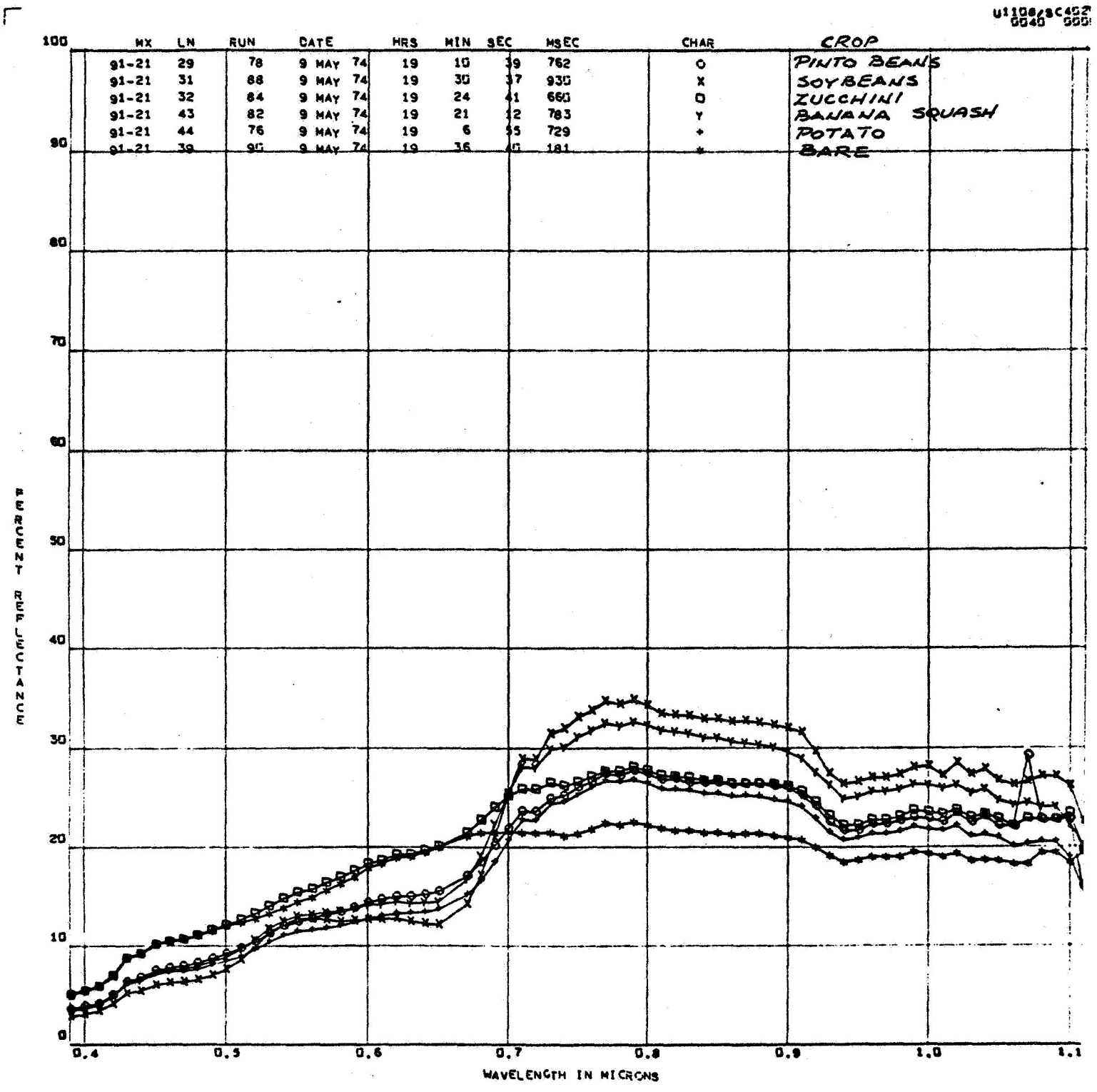
MULTIPLE SPECTROMETER CURVES



MULTIPLE SPECTROMETER CURVES



MULTIPLE SPECTROMETER CURVES



MULTIPLE SPECTROMETER CURVES